MAY 23, 1955

NEWS ISSUE

Electrical World

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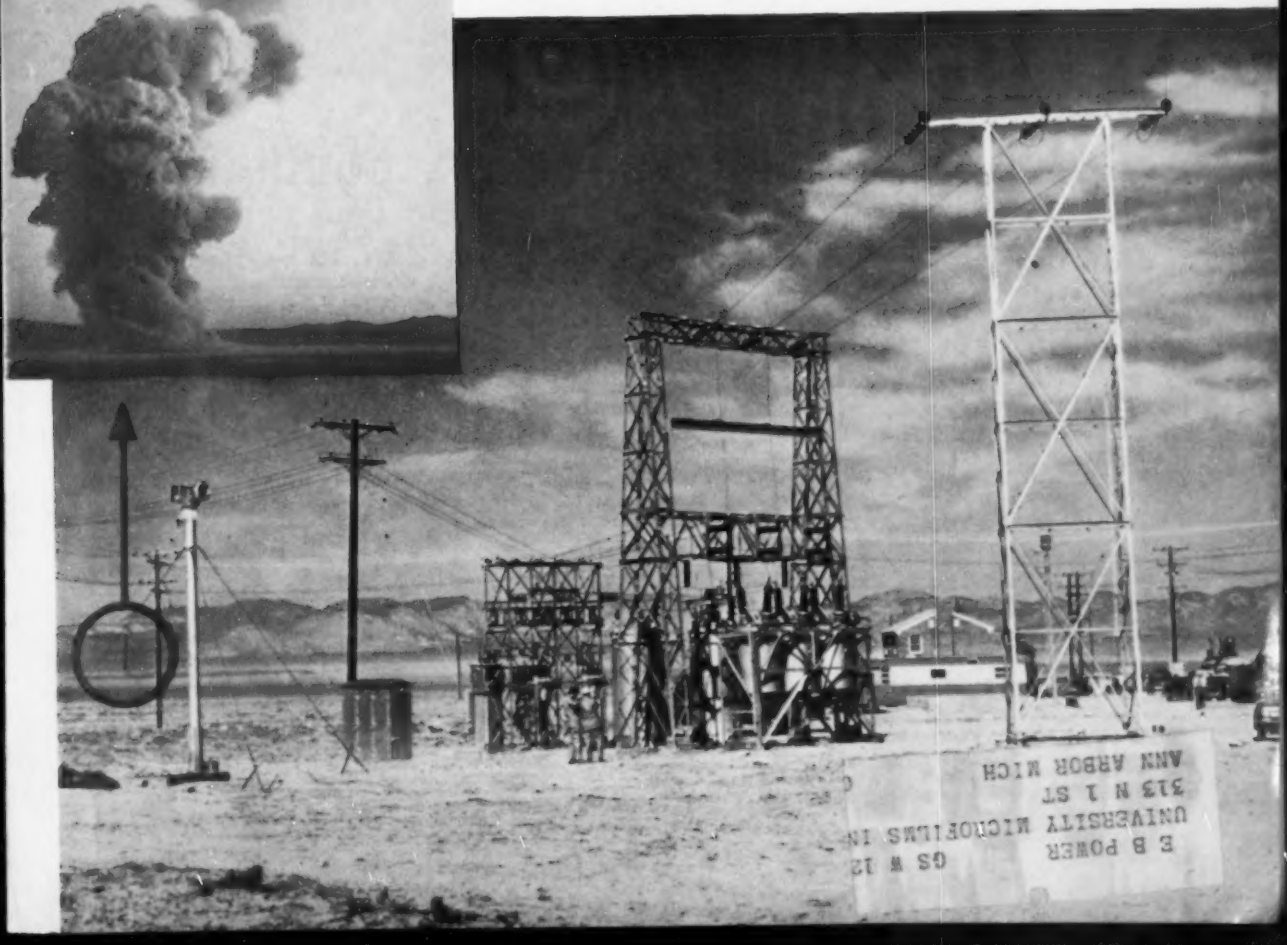
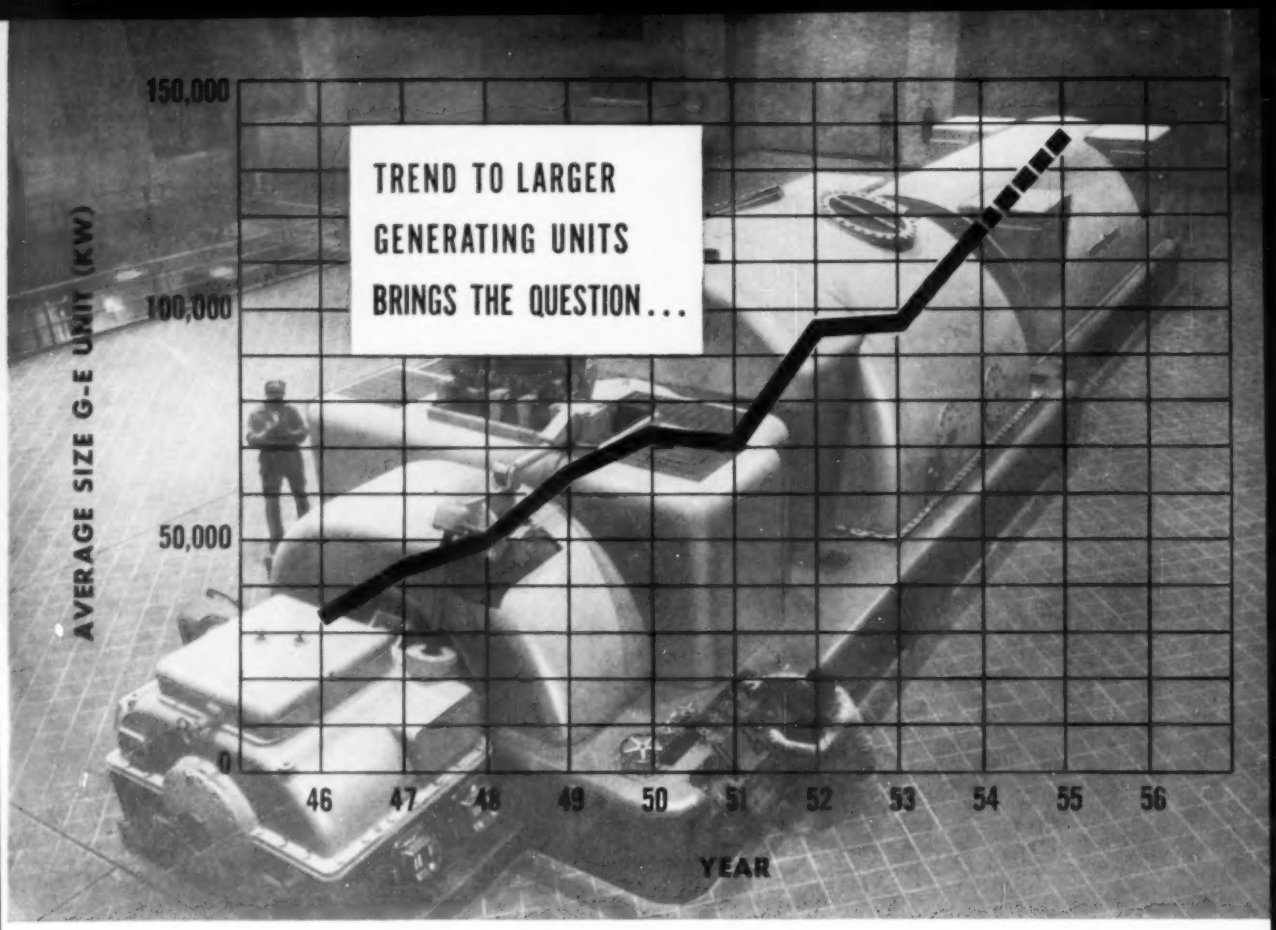
Power System Survives Atom Blast Well

... Page 16

Adequate Wiring Benefits All ... Page 30

Cut Residential Underground Cost ... Page 47





What size machine is most economical?

TREND TO LARGER UNITS, discussed here by A. G. Mellor (right) and Dr. L. K. Kirchmayer, G-E electric utility engineers, is revealed in estimates that average 1955 G-E units will be four times the average size of 1946 units.

Spurred by load growth trends, many electric utilities are now evaluating investment costs, reserve requirements, labor costs, transmission losses, interconnection facilities, and heat rates to determine the best size of generating equipment to meet system expansion.

Application of methods developed in recent General Electric studies to individual systems should help utilities reach the most suitable answer. In general, large generating units are the economical choice.

LARGER UNITS FAVORED

As load growth dictates additional generation, operating economies generally favor the larger units, based on generation costs and manpower requirements. Sometimes investment charges are higher when large units are used, because of increased reserve requirements. However, these fixed costs are often offset by reduced fuel requirements for the portion of the load that the newer unit takes over from older, less efficient machines.

A typical analysis points to units of 7% to 10% of system size as the economic way to add capacity.

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With G.E. constantly making technological developments, units of 350,000 kw are under engineering consideration and units of 500,000 kw are possible in the future.

If load growth follows today's patterns, large generating equipment may prove extremely rewarding. For more complete information on determining the optimum size of generating units, contact your G-E Apparatus Sales Representative, or write for bulletin GER-1030 to General Electric Company, Schenectady 5, N. Y. 301-284

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GENERAL ELECTRIC

Electrical World

Published for 81 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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• • •

COMING NEXT WEEK—With residential load and usage growing steadily, metering is becoming a critical area for many companies. This makes EW's survey of metering practices a timely contribution to the industry.

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ELECTRICAL WORLD

Published weekly by McGraw-Hill Publishing Co., Inc., Executive, Editorial, and Advertising Offices: **McGraw-Hill Building, 330 West 42nd Street, New York 36, N. Y.** Publication Office, 99-129 North Broadway, Albany 1, N. Y.

Donald C. McGraw, President; Paul Montgomery, Executive Vice President; Joseph A. Gerardi, Vice President and Treasurer; John J. Cooke, Secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Advertising Director; J. E. Blackburn, Jr., Vice President and Circulation Director.

Subscriptions: Address correspondence to Electrical World—Subscription Service, 99-129 North Broadway, Albany 1, N. Y. or 330 W. 42nd St., New York 36, N. Y. Allow one month for change of address.

Subscriptions are solicited only from executive, supervisory, and engineering personnel in electric utilities, manufacturing companies, and related fields. Position and company connection must be indicated on subscription orders.

Single copies 35¢. For the United States and possessions and Canada, $6 a year, $9 for two years, $12 for three years. Other Western Hemisphere, and the Philippines, $15 for one year, $25 for two years, $30 for three years. All other countries, $25 for one year, $40 for two years, $50 for three years. Entered as second-class matter at the Post Office at Albany, N. Y. Printed in USA. Copyright 1955 by McGraw-Hill Publishing Company, Inc. Permission required to reproduce any of contents.

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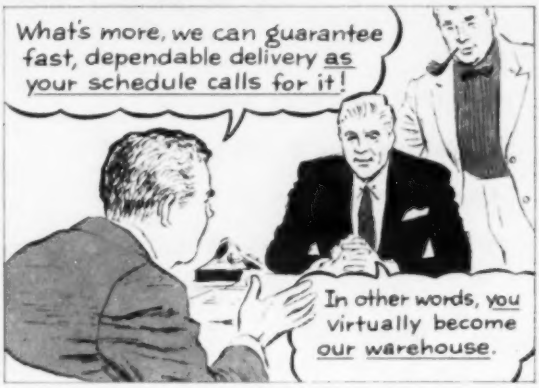
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EDITORIALS

Industry Research Should Be Coordinated

The team of W. A. Lewis, J. E. Hobson, and M. S. Oldacre have rendered a considerable service to electric utilities by focusing attention on the role and progress of research in the industry. It is seldom that a series of papers provokes the controversy which their papers have.

Lewis of Illinois Institute of Technology and Hobson and Oldacre of Stanford Research Institute have advocated that the industry underwrite a central research program employing fulltime scientists and technicians with an annual outlay of several million dollars. In papers delivered before the AIEE and the American Power Conference, the authors have indicated proposed areas of research and outlined their approach to solving these problems.

Utility management and engineers have commented on the proposed research program in public meetings and in private conversations. Most recent reply to the Lewis, Hobson-Oldacre proposals was published in this magazine last week (EW, May 16, p 115).

A study of the original papers and the replies indicate areas of agreement on these propositions: (1) Utilities and manufacturers have conducted considerable research and made extensive contributions to the art of power generation, transmission, distribution, and application. (2) There are still broad areas requiring research. (3) Better coordination and publicity are needed as regards the various research projects being conducted.

The major difference comes on the organization, type, and financing of research by the utility industry. Lewis, Hobson, and Oldacre favor a permanent, central research organization financed on an industry-wide basis and manned by fulltime personnel. They believe the program should include research on fundamental as well as applied science.

Utility engineers who have expressed themselves tend to favor decentralized research by single utilities or utility groups. Financing would be by individual utilities contributing to individual projects or to group projects in which each participates. They lean toward applied research rather than fundamental research.

We believe that the present industry teams conducting study and development on nuclear power schemes offer a pattern to be followed on other research projects. This permits electric companies to choose and support projects on the basis of individual interest and individual need. Company managements would find it easier to justify necessary expenditures on this basis to their stockholders, customers, and regulatory authorities.

We believe electric utilities should concentrate their research efforts on problems having immediate and direct bearing on their operations. Fundamental research should, of course, be supported by the utilities, but this could best be made through contributions to universities and research institutions in the form of fellowships and grants.

Better coordination is vital to future industry-sponsored research. Much of the present controversy would not have taken place if the utility industry had coordinated its research and compiled and publicized its efforts and results. It is mainly a matter of having a central clearing house for research information. Of course some industry-wide direction would be helpful in charting the broad areas of needed research. But this direction would be based mainly on information collected. Such coordination can, and we believe will, come from existing industry organizations.

John Day Proposal Points Way

The bill which would provide for the construction of the John Day Project on the Columbia River offers a promising approach to more power for the Pacific Northwest.

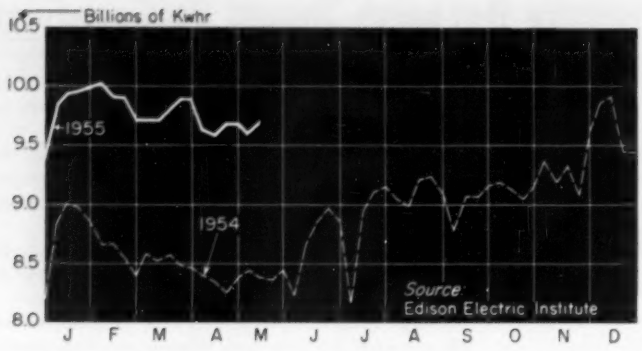
An area dependent on the whims of Congress for its electric power financing is in for trouble. Electric utility men in the Pacific Northwest have known that for years. Men in the Tennessee Valley Authority area are gradually becoming aware of it. For the past eight years Congress has been taking a dim view of national financing for regional development.

Present and expected power shortages in the Northwest are evidence of the fact. Anticipated shortages in the TVA area serve to emphasize it.

The partnership policy of the Eisenhower Administration offers a straightforward solution to the problems posed by too much reliance on federal dollars to generate electric power. The increased activity on the part of electric companies and local public interests in applying for licenses and seeking authority to expand power operation is proof that the partnership policy is catching on despite attempts by factions to belittle and scuttle it.

While created within the framework of the partnership policy, the John Day proposal offers a slightly different approach. Instead of local interests gaining title to the portion of the project which they finance, title is left with the federal government. In return for an initial investment of some $273 million, the participating utilities in the Northwest would gain long-term power contracts for the output of the John Day Project. Three companies—Washington Water Power, Pacific Power & Light, and Portland General Electric—have offered to raise the entire power investment. This would amount to nearly 90% of the total in the $312 million project.

While the John Day proposal is tailored for use in a particular area long accustomed to federal power domination, it appears adaptable to other situations in other areas. When thoroughly considered, we believe it will gain both the business and political support required to put it in action.



OUTPUT

Week Ended May 14
9,673,000,000 Kwhr
Up 15.4%

Atomic Energy Commission requirements — 727,000,000 kwhr (Electrical World estimate) Excluding AEC, output increase was 11.0%

Per Cent Change from Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
May 14	+15.4	+6.3	+8.1	+22.1	+8.0	+21.7	+18.4	+7.0	+10.8	+5.8
May 7	+13.6	+3.6	+6.6	+17.9	+4.4	+21.1	+16.2	+5.9	+11.4	+6.6
Apr. 30	+15.6	+12.7	+9.7	+20.0	+5.0	+22.6	+10.5	+7.6	+13.0	+12.3

Seasonally Adjusted Index 193.4 Week Ago 191.7 Year Ago 168.1

The Issue's News Highlights . . . Plans for another privately financed full-scale nuclear power plant move a step nearer realization with approval by boards of directors of seven Nuclear Power Group companies; GE announces design of a new dual-cycle, boiling-water type reactor for proposed project . . . Twin-tunnel plan for Niagara development is approved by Corps of Engineers . . . Legislation is brewing in Congress to aid utilities in payment of highway relocation costs.

Pacific Coast Electrical Association at annual meeting in San Francisco heard EEI President Harold Quinton urge that "federal government should withdraw" from electric utility regulation which should be left with states where it has proved "responsive to local needs." He added, "We have the obligation to our customers to show how free enterprise cannot be driven out or starved out of the power business without profoundly and adversely affecting the future of other basic industries" . . . Joseph F. Leopold, Dallas, Texas, public relations counsel, called upon Congress to substitute "provisions imposing income tax on total earnings of all co-ops and other tax-exempt businesses."

Cold War? Gas industry has chance of getting fair share of air conditioning market and maybe even dominating it, according to Sheldon Coleman, president, Coleman Co, and former president of AGA. His company is field testing new gas-powered air conditioner which will be in limited production next year and mass production in 1957, he told Southern Gas Association meeting.

Pacific NW: Spring runoff causing rise of foot a day in water levels behind Grand Coulee and Hungry Horse dams, and higher rates at other dams, has resulted in complete resumption of interruptible power deliveries by BPA . . . With its FPC license approved, Washington WP plans to start construction in July on $79-million Noxon Rapids dam. Initial 400,000 kw capability is scheduled for completion in 1960.

NAEC has re-elected Robert A. Zachary, vice president, Public Service E&G, chairman to serve another year. P. L. Smith will continue as president. Elected vice presidents were Howard J. Cadwell, president, Western Massachusetts Electric Co, and T. W. Delzell, chairman, Portland GE.

Associated General Utilities Co, an investment company in the old Associated G&E System, will pay off its bond and debenture indebtedness. All interest on these securities will cease June 1. Company, now in liquidation, still owns 162,330 common shares of General Public Utilities.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Off the Washington Wire: President Eisenhower says his administration would never do anything to wreck TVA. He describes TVA as a "going, historical concern" . . . Budget Bureau is reported ready to go along with TVA's bond financing plan. But geographical boundaries of TVA's power system would be laid out, and Bureau and Congressional approval of all new projects still would be required.

Leak on Hoover task force recommendation to strip TVA of its power plants has Capitol Hill Democrats boiling. Task force reportedly suggested that AEC take over all TVA plants now supplying atomic program, and that rest be sold . . . Rep T. J. Dodd (D-Conn.) has sponsored bill to exempt from Holding Company act utilities and others in financial pools to build new power plants. Pacific P&L and Montana Power have offered government partnership proposal for Yellowtail Dam.

While Cleveland Electric Illuminating denies it, Cleveland reports state that proposed CEI-Pittsburgh Consolidated Coal pipeline plan is dead. CEI is said to have won new coal freight rate decrease in informal agreement with railroads.

Atomic Power: Reports from Britain indicate that she will be ready this August to announce the commissioning of world's first atomic power station of any size. The 60,000-kw station at Calder Hall in North England is said to be nearly ready for operation. Announcement of start up of station may come at the first international conference on peaceful uses of atomic energy at Geneva, Switzerland, August 8-20 . . . Duquesne Light this week receives bids for construction of concrete foundation to support vapor containers surrounding reactor portion of Shippingport atomic power plant. Excavation work for plant is expected to begin soon.

Middle South Utilities has applied to AEC for access to classified, non-military information about nuclear reactors. While noting that at present use of atomic power does not offer economic advantages in Middle South, Pres Edgar H. Dixon says "nevertheless developments are taking place rapidly and nuclear power costs can be expected to decrease markedly" . . . Insurance business may have to syndicate its capacity to provide property and liability insurance for private users of fissionable materials, according to Monroe Maltby, vice president, Johnson & Higgins.

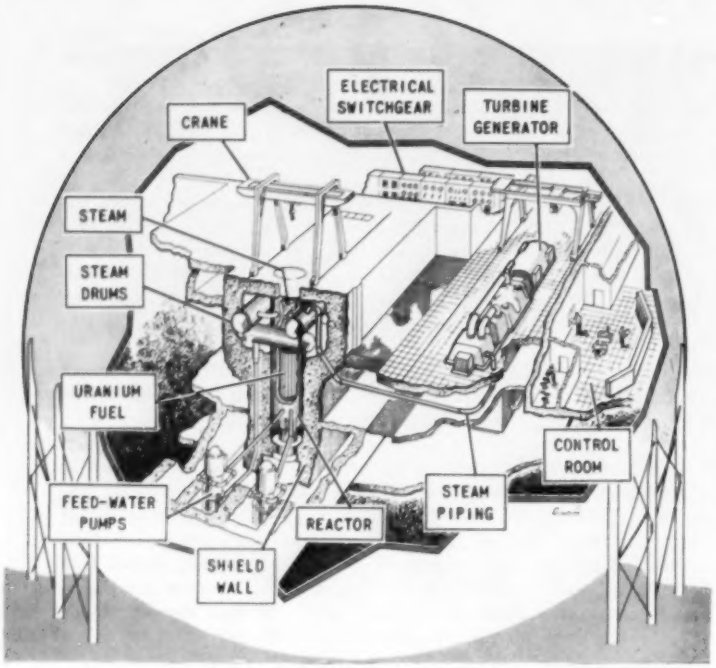
ABOUT PEOPLE IN THE INDUSTRY

Assurance that the government plans to cooperate and not compete with industry in processing of nuclear materials was given this week by Corbin C. Allardice, executive director, Joint Committee on Atomic Energy, before Atomic Industrial Forum's May meeting. While AEC may provide this service, law requires that government "will not discourage sources of supply independent of AEC. Thus Congress recognizes that those activities are in an area in which industry will have a legitimate interest, and government will not be in competition," said Allardice.

Most significant fact in connection with Consolidated Edison's proposed atomic power plant in New York, says Pres H. R. Searing, "is that it offers only way we can see of bringing about lower electricity costs over the long pull . . . Modern technology has pretty well exhausted possibilities of lower generating costs in use of conventional fuels . . . Indeed, if present inflationary trend continues, it is hard to see where further improvements in technology could make more than a dent" in costs, he adds.

More News About People page 36

Plans for Atomic Power Plant . . .



to be built by
General Electric Co

to be financed by
Commonwealth Edison Co
Bechtel Corp
American G&E Service
Pacific G&E
Union Electric of Missouri
Central Illinois Light Co
Illinois Power Co . . .

. . . Approved by 7-Company Team

Plans to build a full-scale atomic power plant, financed entirely with private funds, recently moved a step nearer realization when the seven member companies of Nuclear Power Group announced approval of the project by their boards of directors.

General Electric Co, prime contractor for the proposed 180,000-kw plant (sketched above), followed the announcement with another stating that a new dual cycle boiling water reactor had been designed for the venture.

As the companies involved pushed ahead with their plans, one important hurdle still remained: Approval by the Atomic Energy Commission. Through Commonwealth Edison Co, the Power Group companies submitted their proposal to AEC on March 31. The commission has not had time to act on the proposal since required approval of the companies' boards of directors was obtained so recently.

The Nuclear Power Group, a nonprofit organization, started originally with five members—American Gas & Electric Service Corp, Bechtel Corp, Commonwealth Edison Co, Pacific Gas & Electric Co, and Union Electric Co of Missouri.

Later they were joined by two more utilities, Central Illinois Light Co and Illinois Power Co. The group plans eventually to incorporate itself.

If the proposed plant is approved by the AEC, Bechtel Corp—only nonutility member of the power group—will act as engineer-constructor for General Electric Co which has been selected as prime contractor for the project.

The new reactor designed by GE for the privately financed plant has been described as a "major advance toward the economic generation of electricity from atomic energy." Francis K. McCune, GE's vice president and general manager of the company's Atomic Products Division, said that the new design is for a dual-cycle boiling reactor with several times the production capacity of its predecessor, the direct boiling reactor.

The following salient points of the new reactor were emphasized by McCune:

- Steam can be generated directly inside the reactor core thus eliminating the need for heat exchangers and for high operating pressures and temperatures used in liquid water-cooled reactors.
- Safety factors are equivalent to those incorporated in the direct boiling reactor while stability with relation to load has been improved.
- A "flash tank" system automatically controls the amount of steam by supplying cool water as load increases.

GE has contracted to construct the project for $45 million. The plant will be owned and operated by Commonwealth Edison and will be located on a 750-acre site near the confluence of the Kankakee and Des Plaines Rivers in Grundy County, Ill.

Financial arrangements, utilizing only private funds, provide that Commonwealth Edison invest $30 million of the contract price. This amount along with the cost of the plant site

($500,000) and sundry overhead costs will be included in the company's utility plant account. Commonwealth also will pay an estimated $4.5 million for transmission facilities.

The other six companies in the Nuclear Power Group will cover the rest of the contract price by channeling a total of $15 million into the organization's coffers over the five-year estimated construction period.

In a joint statement the seven companies declared that no request will be made for government funds or for accelerated amortization.

Rayburn Speaks

Sam Rayburn, speaker of the House of Representatives, told some 1,250 dinner guests at the recent 20th annual meeting of the Georgia Rural Electric Membership Co-operatives that REA members have "brought the greatest economic upsurge in the history of rural America."

The private power companies, Rayburn added, had been helped rather than hindered by the development of the REA.

Last year the power companies sold the REA co-ops some $57 million worth of power, he said, adding that included among the purchasers were "a few short sighted power companies that opposed the REA."

Although the purpose of Rayburn's visit to Georgia, on the surface, was to address the REA groups "and do a little fishing," some observers took it as an indication that the Democratic leader was lending his support to the Georgia REA's in their efforts to acquire title to Clark Hill power. However, Speaker Rayburn refused to comment on this subject.

Twin Tunnels for Niagara . . .

. . . okayed by Army Corps of Engineers; three governors must review development plan before presentation to Congress

The top-level review of the Army's Corps of Engineers has stamped its approval on a $424,735,000 Niagara Falls power redevelopment plan, utilizing a twin, covered-tunnel headrace to transport water through the heart of the city of Niagara Falls (EW, April 4, p 61).

Under heavy pressure from civic leaders and the Republican member of Congress who represents Niagara Falls, Rep William E. Miller, the Board of Engineers for Rivers and Harbors unanimously recommended that the technically superior and far less costly open-canal plan be given no further consideration. It would cost $55 million less than the twin tunnels.

Governors Must Comment

The board's recommendations will go to Congress after comments have been obtained from the governors of New York, Ohio, and Pennsylvania, where the new Niagara hydroelectric power eventually will be marketed.

Contemplated in the plan adopted by the Engineer Board is an initial power development with dependable capacity of 1,723,000 kw.

It involves construction of a water intake above the famed cataract near Conners Island, the 25,100-foot-long twin tunnels under the city of Niagara Falls connecting with a 1,512,000 kw powerhouse at Lewiston below the falls, and a supplementary storage reservoir about a mile east of the power plant. Concrete lined, the tunnels would be 46 feet in diameter. Water pumped into the reservoir during off-peak-demand hours would be released at periods of peak demand.

Niagara Falls was first tapped as a source of energy by a now-absorbed subsidiary of Niagara Mohawk Power Corp.

Although a new U.S.-Canadian treaty reallocating diversion of the river waters for power use was ratified in 1950, no new generating plants are underway on the U. S. side of the falls. Niagara Mohawk's Adams and Schoellkopf Plants, erected decades ago, have a total 445,000 kw capacity.

Across the river in Canada, the Ontario Hydro-electric Commission has been driving ahead. When the Sir Adam Beck Plant No. 2 is completed in 1957, Canadian generating capacity at the falls will be 2,048,000 kw. Power was put on the line from the Sir Adam Beck No. 1 last year.

Until American plants have been built to use the U. S. share of power diversion, Canada under the 1950 treaty may use both countries' shares.

With this in mind, the Rivers and Harbors Board's report on the Niagara redevelopment advised Congress to act promptly in adopting the redevelopment plan and in designating an agency to construct and operate the project.

Congress has been snarled in a fight for nearly five years over whether the private power companies on the scene or a public agency shall be authorized to undertake the project. Neither Niagara Mohawk and four associated New York companies nor the New York State Power Authority have been able to muster a majority vote in both Senate and House to obtain a congressional go-ahead.

Project Delay Is Costly

The Engineers' report to Congress pointed out that every year of further delay entails a loss of from $8 million to $28 million in net power benefits to the Niagara Frontier and adjoining service area, amounts depending upon the type of financing assumed.

Before the Army Board plumped for the tunnel plan, it was told by its engineering staff that "the project is economically justified whether constructed with public or private financing and is justified with either canal or tunnel headraces."

Staff Engineer Samuel Gale noted that intense local opposition to the $369,735,000 open-canal project inevitably would cause long delay in construction since community interests would surely resort to all available legal devices to oppose the canal.

"The differential of $55 million between the first costs of the two plans could be offset completely within a very short period of delay" by the loss of power benefits, he declared.

Relocation Costs May Be Cut

Outlook favorable for Congress to approve reimbursement of utilities for expenditures caused by federal highway program

Congress probably will vote to reimburse utilities for part of the relocation costs necessitated by the federal road-building program in states which do not now provide such aid.

In the past, the $500-million annual federal-aid highway program has gone ahead with little regard to the costs electric, water, gas, and transportation utilities face when new roads crowd them off public rights-of-way. Only where state laws require the states themselves to help reimburse the utilities for these relocation costs has the federal government chipped in—always an amount based on its share of the road-building program in each state.

Now, largely due to the efforts of one man, a new philosophy may be taking hold. If the rest of Congress will go along with Sen Francis Case's idea, utilities in all states will be reimbursed for at least a share of relocation outlays next year.

Case, the only Republican on the Senate Public Works Committee who voted with the Democrats in favoring Sen Albert Gore's highway program over that of the President, tried to get a relocation reimbursement provision in last year's annual road-building bill, but he lost out. This year he was successful in getting the committee to adopt his view that the government should contribute up to 50% of the cost of relocation in states which leave all such costs up to the companies for payment.

Considerable amounts of money are involved. A recent Bureau of Roads survey showed that in 1953 utilities of all types spent $29.1 million in relocating their facilities to make room for the road-building program. Of this, they received only $3.8 million as reimbursement.

In states where reimbursement is the rule, no change would be made by Case's amendment. But the added federal contribution in states which do not provide such payments would raise the overall government share and cut down on this profitless type of utility outlay.

Case's amendment has not yet found its way into legislation being considered by the House Committee. Although it now has Senate Public Works Committee approval, it could be knocked out during debate on the Senate floor. But Senate aides think it has a good chance of passage this session. If it does get through, it could be an opening wedge for greater contributions on the part of both the federal government and the states toward removal of a nagging utility headache.

U. S. Power Policy Scored

Another Congressional unit is going after the Administration's power program. This time it's a House government operations subcommittee.

Democrats charge that the law has been violated. They're pinning this on an August 11, 1954, regulation that reversed a Supreme Court-upheld Interior Department ruling of six years earlier. The August 11 regulation also was upheld by Supreme Court.

As originally written under the Truman administration, this regulation provided that the government could require a private utility which applied for a transmission line across public lands to set aside excess line capacity and to wheel federal power to preference customers. The Idaho Power Co and Pacific Gas & Electric Co fought it, but the Supreme Court upheld the regulation in 1952. Two years later, the Interior Department rewrote the rule to remove this point.

Democrats charge that 10 of the 14 points in the revised regulation were adopted verbatim from a PG&E memorandum.

Recent subcommittee hearings aired views held by witnesses hostile to the present Administration's policies. Testimony was heard from Assistant Interior Secretary C. Girard Davidson and former Department Solicitor Masten G. White. Among the things they objected to were:

- Requirement that a federal power customer build a transmission line to collect power. Davidson said the department has required this with full realization that preference customers can't afford the huge transmission facilities required and that this ends their traditional dependence on the government to carry power earmarked for them into load centers.
- Withdrawal of Bonneville Power Administration's authority (in April 1954) to recommend new dams and transmission lines as a means of enticing power-using industries into its area.

Subcommittee hearings will dig deeper into these and other actions of federal power agencies as hearings continue with the Administration's defense presented by Under Secretary of Interior Clarence A. Davis, and Ralph Tudor, who was Under Secretary when the Wheeling rule was changed.

Canaday Named

Paul O. Canaday, vice president of Middle South Utilities, Inc, and of Mississippi Valley Generating Co and director of the latter, has been named managing director of MVGC by Edgar H. Dixon, president of both companies.

Canaday, described by Dixon as "one of the ablest men in the electric utility field," will direct construction of MVGC's new $107 million steam electric plant at West Memphis, Ark. Ground-breaking ceremonies for the plant have been set for June 2.

Why this cable will let you **sleep nights**

Everyone concerned with maintenance wants to minimize those calls about out-of-service lines—calls that always seem to come at night.

There *are* but a few premium quality cables—well designed, well made, quality controlled, tested—which *will* reduce your cable failure problems to an absolute minimum.

One of these power cables is Rome's service-tested and proven RoZone-RoPrene.

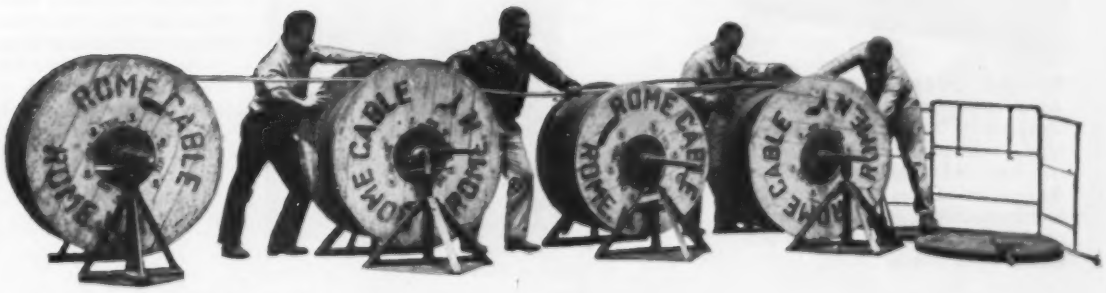
RoZone—premium quality, oil-base type insulations give you—

- High dielectric and impulse strength
- Excellent resistance to corona and ozone cutting
- High resistance to effects of moisture (superior in this respect to other rubber compounds)
- Electrical properties practically unaffected by long-time immersion in water or burial in the ground
- Long life (maintains desirable characteristics for many years)
- Versatility (recommended for voltages from 600 to 15000)
- Guarantee of correct manufacture through the ionization testing of every foot of RoZone-RoPrene, rated at 3000V or over.

RoPrene—rugged, specially designed Neoprene sheath gives you—

- Strength and toughness (abrasion resistance provides maximum mechanical protection)
- Resistant to fire (accepted as standard sheath for mining cable where flame resistance is a mandatory requirement of Safety Codes)
- Excellent heat resistance (withstands continuous temperatures up to 75°C. without deterioration)

It will pay you to investigate the advantages of this quality cable—RoZone-RoPrene. Write for detailed data. Rome's personalized engineering help is yours for the asking.



Rome RoZone-RoPrene network cable being installed in Pacific Gas and Electric 600-volt underground distribution system in downtown San Francisco.

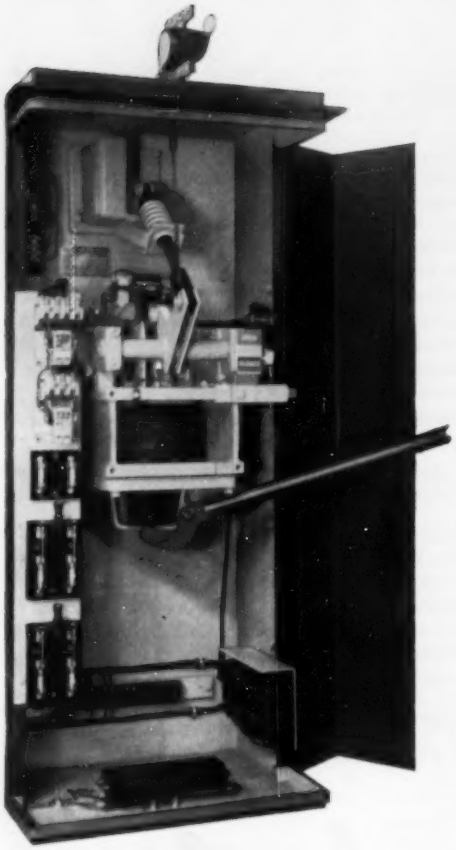
It Costs Less to Buy the Best

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

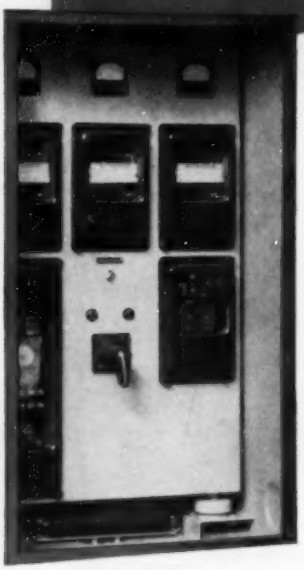
If You Worked on Breakers...

this is the breaker you'd buy!

The minute you open the operating cabinet you have the story. Clean design! Everything you ever wanted to get at for any reason is right out in the open. Check a few of the many features of this outstanding breaker, then GET COMPLETE INFORMATION! Call your nearby A-C district office, or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4252



ROOMY OPERATOR CABINET. Access to operator is unrestricted. Operator is high speed solenoid type — mechanically and electrically trip-free. Side hinging of L-shaped doors allows access to operator cabinet from three sides. Only 7 inches of clearance needed in front of cabinet to open doors.

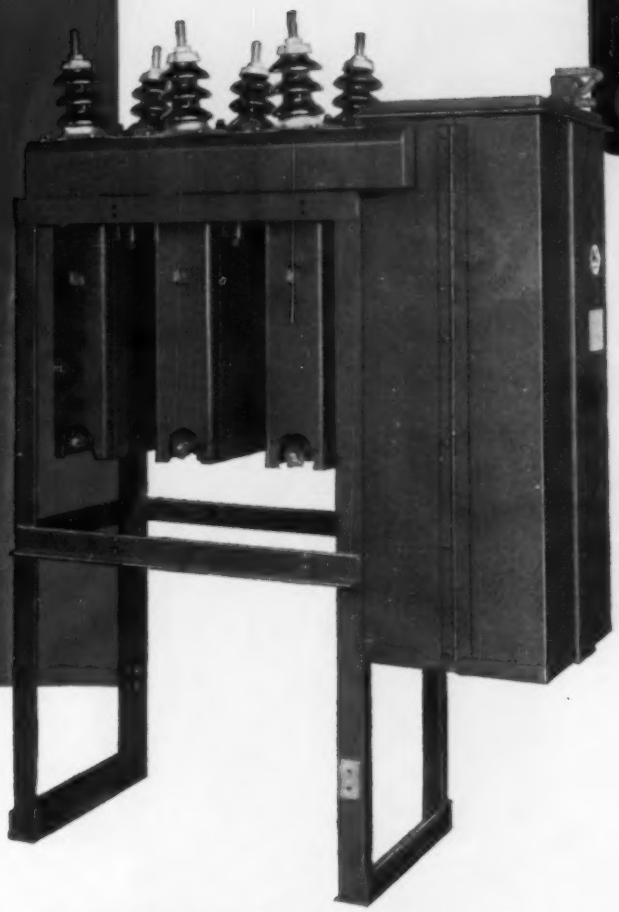


RELAY CABINET. Relays when specified are in separate cabinet, which can be secured against unauthorized personnel. Relay panel is fixed. This eliminates troublesome hinge wiring. Door at rear provides access to back of relays. Panel is shock-mounted at four points so relay contacts are not operated accidentally by breaker vibration or slamming of cabinet door.

A-C ALLIS-CHALMERS

ALLIS-

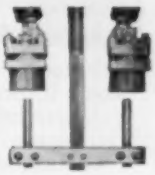
ALLIS-CHALMERS
14.4-kv
Oil Circuit Breakers



TANK-PER-PHASE construction — as used in large breakers — has high safety factor. It completely isolates phases and eliminates possibility of internal phase-to-phase flashover. A maximum of 12 gallons of oil in each tank makes it a simple matter to raise and lower tanks.

VISIBILITY PLUS — external position indicator easily visible at a distance from front or side. Contact position indicator also provided inside. In addition, maintenance closing device is side operated. Man closing breaker can observe contacts and man working on them.

DOUBLE BREAK per phase principle is used with time-proved *Ruptor* interrupting devices. Self-wiping, self-aligning tulip and bayonet contacts are used. Here again, Allis-Chalmers provides the same quality construction as is used on large A-C breakers.



NO BURIED LEADS. No more conduits, pipes and fittings! To get at bushing current transformer leads, simply remove 3 pins at bottom of fabricated wiring duct and remove bottom plate. This is typical of the well-engineered features that make this breaker outstanding in its field.

BREAKER RATINGS (8-Cycle Standard Interrupting Time)

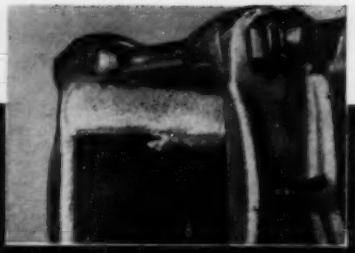
Type	Rated Kv	Rated Amps	INTERRUPTING RATING RMS TOTAL AMPERES At Rated Volts	INTERRUPTING RATING RMS TOTAL AMPERES Maximum Rating	INTERRUPTING RATING Kva	Weight of Breaker With Oil (lbs)
OZ-15-100	14.4	600	4,000	15,000	100,000	2,350
OZ-15-250	14.4	600	10,000	23,000	250,000	2,370
OZ-15-250	14.4	1200	10,000	25,000	250,000	2,470
OZ-23-250	23	600	6,300	12,000	250,000	2,370

Ruptor is an Allis-Chalmers trademark.

CHALMERS

Cast-to-size power connectors . . .

retain a rough, durable surface . . .



that results in positive advantages

why casting to size means improved performance with DELTA-STAR Power Connectors

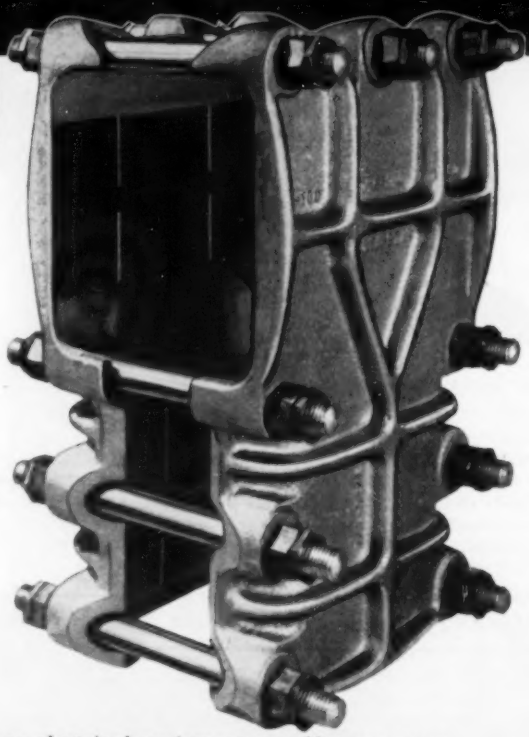
Featuring highly efficient contacts, strong gripping action and full-strength durability

Because power line efficiency depends on them, it certainly pays to evaluate the advantages offered by Delta-Star *cast-to-size* connectors.

Casting to size produces a hard, rough surface, forming hundreds of contact points. These points dig into softer bus copper. Current carried by each point is relatively small—assuring highly efficient current flow. These hundreds of contact points also provide positive gripping action.

Delta-Star's cast-to-size connectors retain full strength of the fitting because *surface* strength isn't machined off. Large cross sections and high-strength bolts on Delta-Star connectors develop strong, efficient joints. Long connector service naturally follows.

Cast-to-size advantages come to you in Delta-Star's *complete* power connector line. All types are available—copper to copper, copper to aluminum and aluminum to aluminum. Ask for Bulletin 38-E.



When you want the best in high voltage electrical equipment, specify DELTA-STAR

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
OF PITTSBURGH
2437 Fulton Street • Chicago 12, Illinois
District Offices in Principal Cities

BPA's Grid . . .

. . . to help provide dam-to-market transmission for NW partnership projects

Bonneville Power Administration's "backbone transmission grid" for the Pacific Northwest will be made available to builders of "partnership dams" —like Priest Rapids or John Day—to aid in delivering the energy to key load centers which often lie at great distances from generating plants.

Administrator William A. Pearl reports his staff is now working out wheeling cost formula for this service to be on a reimbursable basis. It is the intent of the government to help in this way to surmount one of the major problems in determining economic feasibility of non-federal or partnership developments that could ease the threat of future power deficits in the region.

Authorized by McKay

Pearl, speaking before the North Idaho Chamber of Commerce in Lewiston, revealed the program had been authorized by Secretary of the Interior Douglas McKay.

"It is clear," Pearl said, "that transmission of energy from proposed non-federal or partnership projects, and their integration with the regional network are the major problems in determining their economic feasibility.

"An added problem is the fact that, almost without exception, the energy produced from the large projects cannot be absorbed in any one load center. To get the maximum prime power at the minimum cost, it is advantageous to integrate new generation with the existing region-wide pool. The result is that it becomes almost imperative that fullest utilization be made of the federal system's transmission grid.

"The Bonneville Power Administration has been authorized by the Secretary of the Interior to work out details by which this can be achieved on a mutually satisfactory basis. This wheeling arrangement will provide the necessary revenues to reimburse the federal government for the facilities used.

"This arrangement for moving power from the new dams will be less expensive than the construction of separate or duplicate transmission facilities by sponsors of the projects and will preserve the integrity of the Northwest power pool. Consequently, it will be of benefit not only to the utilities involved but to the federal government and to all the people of the region.

"Bonneville has the backbone transmission grid. It should be used to take the power from the proposed dams to the markets that are waiting for it. This should remove a major obstacle to the construction of partnership projects, already authorized or under consideration, and spur them to completion prior to the period when our power shortage will otherwise become acute . . . "

Changes in Capacity Reported to FPC

PLANT ADDITIONS DURING MARCH

State	Utility	Plant	Fuel	Capacity (Kw)
N. J.	South River Board of Public Works	South River	IC	1,100
Ohio	Greenfield Water & Light Dept.	Greenfield	S	1,800
Ohio	Ohio Valley Electric Corp.	Kyger Creek	S	200,000
Ind.	Indiana-Kentucky Electric Corp.	Clifty Creek	S	200,000
Ind.	Municipal Electric Light & Power Plant	Whitewater	S	30,000
Ill.	Iowa Illinois Gas & Electric Co.	Moline	S	25,000
Ill.	Commonwealth Edison Co.	Will County	S	150,000
Minn.	Wells Public Utilities	Wells	IC	1,360
Iowa	State Center Light & Power Dept.	State Center	IC	746
Iowa	Bancroft Municipal Electric Plant.	Bancroft	IC	588
Fla.	Lake Worth Utilities	Lake Worth	IC	1,100
Fla.	Lake Worth Utilities	Lake Worth	IC	1,100
Ky.	East Kentucky Rural Electric Corp	Dale	S	20,000
Ky.	Tennessee Valley Authority	Shawnee	S	135,000
Tenn.	Tennessee Valley Authority	Kingston	S	180,000
Ala.	Tennessee Valley Authority	Colbert	S	180,000
Tex.	Dallas Power & Light Co.	Parkdale	S	100,000
Ariz.	Arizona Public Service Co.	Douglas	IC	1,160
Ariz.	Arizona Public Service Co.	Miami	IC	2,500
Utah	Moon Lake Electric Association	Diesel	IC	2,500
Calif.	Pasadena Municipal Light & Power Dept.	Broadway	S	40,000

RETIREMENTS

N. Y.	Niagara Mohawk Power Corp.	Charles R. Huntley	S	60,000
Ill.	Northwestern Illinois Gas & Electric Co.	Savanna	S	1,000
Wisc.	Fennimore Utilities	Fennimore	IC	400
Minn.	Wells Public Utilities	Wells	IC	427
Iowa	Iowa Electric Light & Power Co.	Bennett	IC	40
Neb.	Crete Municipal Utilities	Crete	IC	240
Va.	Virginia Electric & Power Co.	Twelfth Street	S	7,250
N. C.	Virginia Electric & Power Co.	Roanoke Rapids	H	2,400
Ky.	Kentucky Utilities Co.	Paducah	S	4,750
Ariz.	Arizona Public Service Co.	Casa Grande	IC	1,660
Ariz.	Arizona Public Service Co.	Yuma	IC	2,500
Utah	Moon Lake Electric Association	Diesel	IC	530
Calif.	California Electric Power Co.	San Bernardino	S	4,000

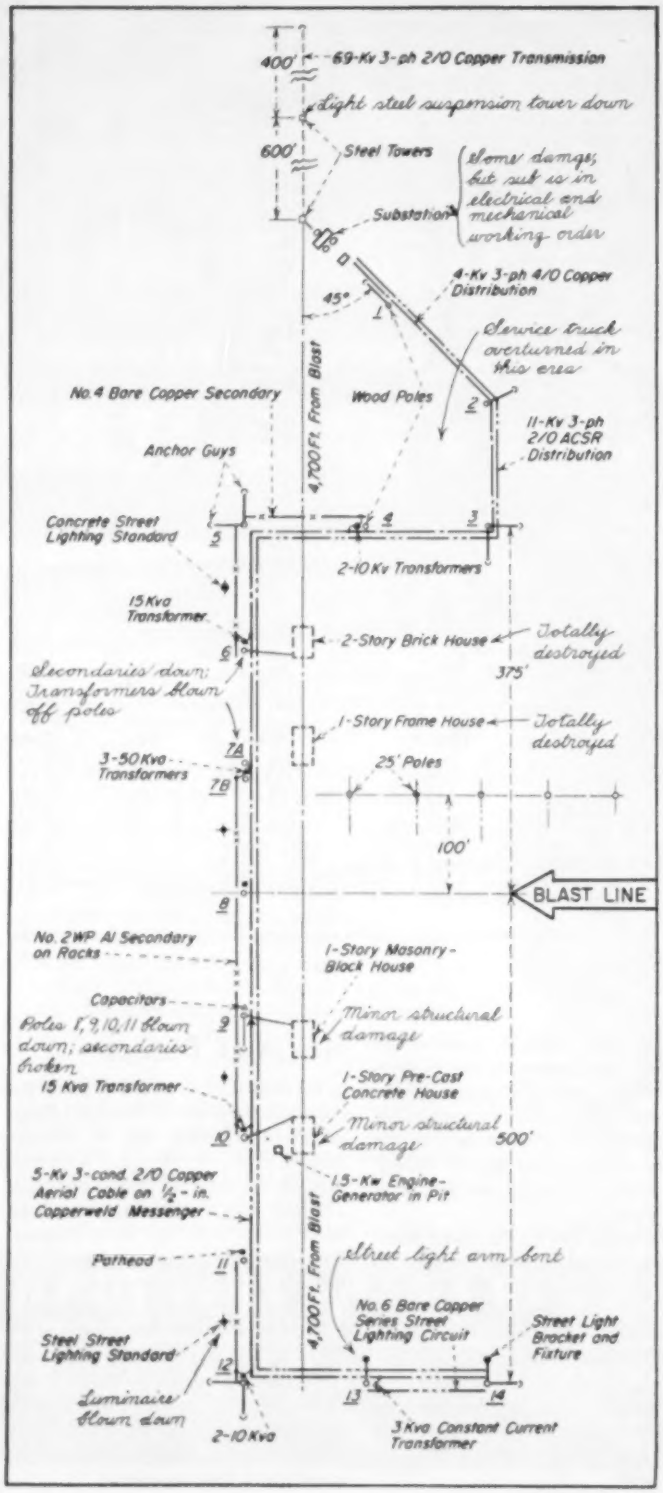
U. S.	Hydro	Steam	IC	Total
Added	.....	1,261,800	12,154	1,273,954
Retired	2,400	77,000	5,797	85,197
Adjustments Plus	120	21,000	13,838	34,958
Adjustments Minus	60	35,962	1,230	37,252
Net Change Plus	2,340 (Minus)	1,169,838	18,965	1,186,463

H—Hydro, IC—Internal Combustion, S—Steam
United States Capacity as of April 1—Hydro 23,605,552 kw; Steam 79,026,303 kw; IC 2,296,422 kw; Total 104,928,277

New AIEE District

Formation of a new district in the American Institute of Electrical Engineers' organization will be effected August 1, W. B. Morton, vice president of the institute, has announced. The new East Central District will be made up of Ohio and West Virginia, both formerly a part of the Middle Eastern District, largest of AIEE's present ten. Change in the geographical structure, establishing a total of 11 districts, was required to make administration easier, Morton said. Julius Strassbourger, assistant to purchasing agent of Cleveland Electric Illuminating Co, has been named vice president of the new district.

Power Lines Stand Atom Blast Well



• Electric systems should fare better in a nuclear blast than the residences and industrial buildings to which they supply power.

• At the same distance from ground zero, overhead lines and equipment should suffer less damage than buildings.

• Nature of the damage is such that the system could be put back in operation easily and more quickly (probably in 8 hrs) than the community might have need for power.

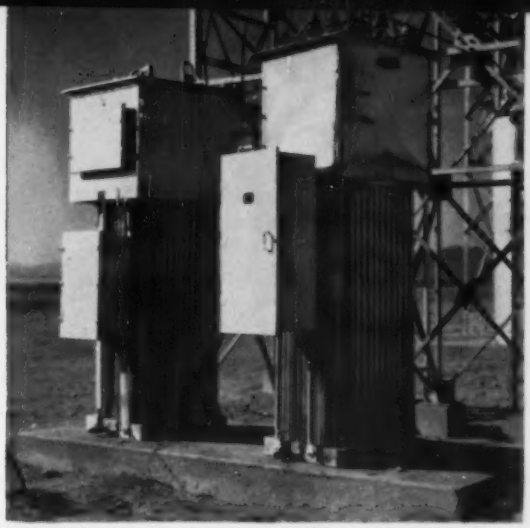
These conclusions were clearly demonstrated on May 6 by Operation Cue, the nuclear test at the Nevada test site conducted jointly by the Atomic Energy Commission, Federal Civil Defense Administration, and the Department of Defense. Participating in the operation for the industry was Edison Electric Institute.

Damage to electrical equipment was confined to overhead lines generally and was caused primarily by the blast wave. The overpressure (instantaneous pressure above normal atmospheric) at 4,700 ft from ground zero was estimated at 6 psi while the yield of the nuclear device was estimated at 35 kilotons of TNT. There was no appreciable damage from either the thermal wave or radiation.

Lines at 10,000 ft Undamaged . . . Of two identical electrical installations, facilities at 4,700 ft from ground zero suffered all the damage. Lines and equipment at 10,500 ft were undamaged. Installations consisted of a 69-kv steel tower transmission line, a 66/11/4-kv distribution substation, and overhead distribution lines carrying 11-kv and 4-kv primaries, open-wire and cabled secondaries, service drops, and street lighting circuits.

After the blast a test of the substation at 4,700 ft showed there were no electrical breakdowns and all equipment to be in mechanical working order. Results of meggering and hi-potting of the remainder of all equipment in both installations, including

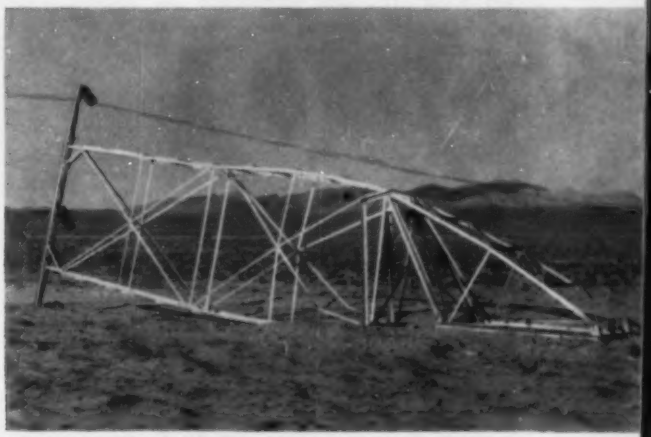
Text continued on page 20
See also In The Industry, p. 62



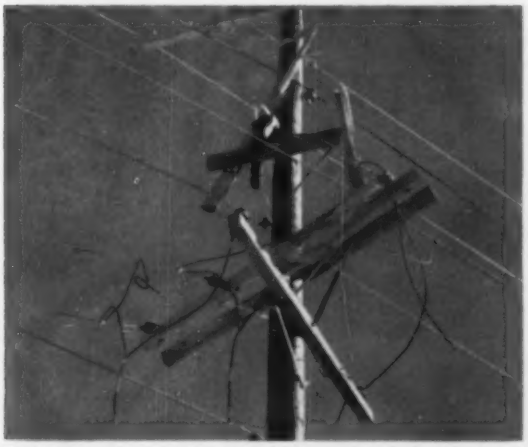
TWO LOAD REGULATORS were shifted slightly on bases. Top cabinet on near regulator had dished-in panels. Two leads to bus insulators were pulled from their connectors

REAR COLUMNS on switching structure had angle on side away from blast buckled at bolt holes and upper portion warped. Two insulators on "disconnects" were a bit chipped

RELAY HOUSE for substation had back panels dished in and foundation uplifted. Batteries were knocked from shelves. Only apparent instrument damage was to a glass case



LIGHT SUSPENSION TOWER holding 600-ft span of 2/0 copper had vertical steel angle on side away from blast fail at bolt hole at the height of first horizonital brace

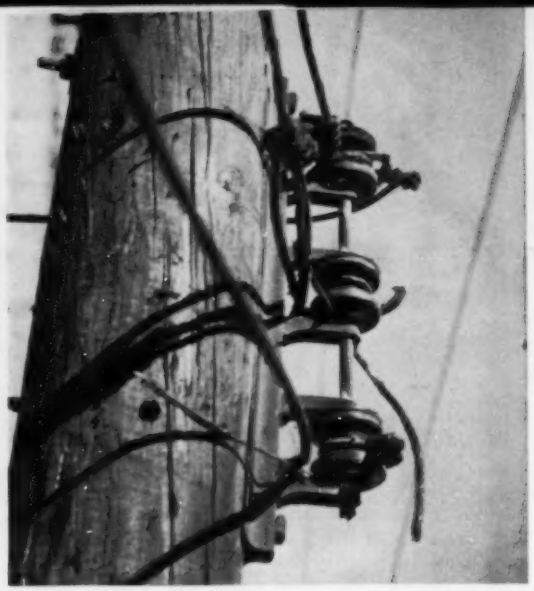


PRIMARY ARM for 4-kv 3-ph 4/0 copper was shattered and double arm for No. 2 WP aluminum was torn loose. The 15-kva transformer (foreground) was blown 35 ft from the pole

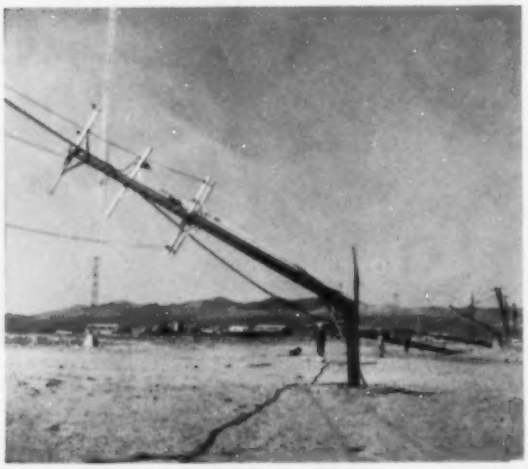
DIGGER TRUCK OVERTURNED was crosswise to blast. Cabs and doors on both vehicles were dished-in and windows broken. Tools on truck were undamaged and truck operable

For more pictures turn page

NO. 2 WP ALUMINUM SECONDARY was wrapped around street lights standard by blast. Three 50-kva transformers were blown off the two-pole platform seen in the background



ASPHALT WAS BOILED from weatherproofing of No. 2 aluminum secondary by thermal wave. Effect of heat on other parts was limited to minor burning of arms and paint



FOUR OF FIFTEEN POLES were toppled. Line, normal to blast, carried 11-kv 3-ph 2/0 ACSR, 5-kv 3-conductor 2/0 copper aerial cable. Secondary was No. 2 WP aluminum

CROSSARMS probably were damaged when pole fell across guys of radio tower. Capacitor bank, insulators, hardware, and aerial cable were undamaged. Steel pins were bent

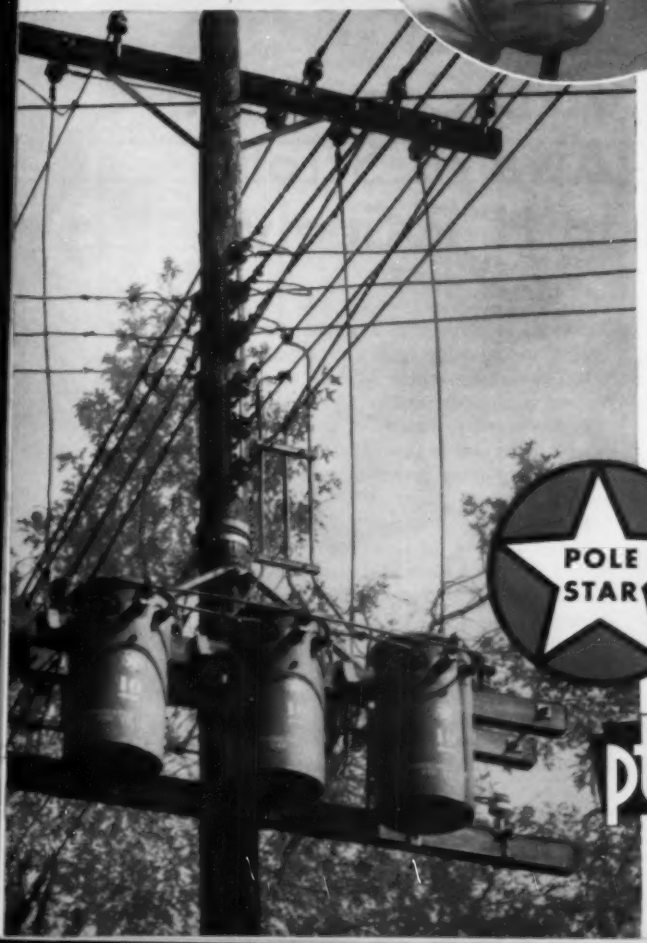
LUMINAIRE from street light standard fell to ground 15 ft toward ground zero. Negative pressure wave probably blew down the unit after initial blast wave had loosened it

UTILITY FACILITIES stood up quite well as compared with other structures. Indications were that a stricken utility could supply power as soon as it would be needed

"Hold it, George!

You don't need all that stuff to make a line connection to a Pole Star"

The Basic Impulse Level of all Pole Star bushings is co-ordinated with the transformer windings. When the transformer is subjected to a voltage surge above the BIL of the bushing, the bushing will flashover on the outside. A separate, completely co-ordinated bushing is available for each voltage class.



If it's a high voltage sidewall bushing, George won't even need a wrench to make a line connection. He can simply insert the incoming cable through the side opening and turn the corrugated easy-to-grip handle. This tightens the pressure block against the cable in a vise-like grip. Most bushings are constructed so that leads can be brought into them from two points 180° apart. The generous-sized handle is constructed of a specially formulated, high dielectric strength, high impact strength, low power factor material. The handle will not break to expose live parts nor chip to cut a lineman's glove.
And George can throw away that X-ray gadget, too. He won't need it because he'll be able to see what he's doing while making line connections up there.

High voltage cover bushings and low voltage sidewall bushings have solderless connectors which are tightened with only a standard wrench to hold line leads securely. All Pole Star bushing terminals are suitable for copper or aluminum cable.

Pennsylvania Transformer Company
A McGraw Electric Company Division
CANONSBURG • PENNSYLVANIA

Pole Star transformers are available in sizes 3 Kva through 500 Kva and in voltages from 480 through 67,000 volts.

Atom Blast Damages Lines Less Than Buildings

(*Continued from page* 16)

transformers blown to the ground, were not available at the time of writing.

Facilities for both installations were designed and built by Bechtel Corp, San Francisco, based on standards of Southern California Edison Co. Equipment for poles and the substations was taken from regular or salvaged but usable stocks, and all other material was bought new. Both systems were in operating order immediately before the test.

Comparison of damage to electric facilities with destruction of typical residential, commercial, and light industrial buildings is detailed in the accompanying sketch. At the 4,700-ft line typical two-story brick and one-story homes were destroyed. Two homes of reinforced construction had doors and windows blown in. However, these structures are not typical of residential construction in the United States. As against this damage, it was estimated that power could be restored within 8 hr.

A two-story redesigned frame house at 5,500 ft suffered severe damage and would not be suitable for use without extensive repairs. Three types of light industrial buildings at 6,800 ft could not be used without extensive repairs or complete replacement. Based on damage to the system at 4,700 ft, electric power could be available long before there was a need for it.

At 7,800 ft from ground zero a two-story redesigned house was damaged relatively heavily although it could be used as an emergency shelter after not-too-extensive repairs. Two homes at 10,500 ft suffered considerable damage while two others of reinforced construction had relatively minor damage. These latter two could be turned into emergency shelters at a reasonable cost. Because the electrical facilities at 10,500 ft suffered no damage, power would be available immediately.

Three types of industrial buildings at the 15,000-ft line suffered damage ranging from severe to negligible, but they still could provide shelter to interior contents.

SEELYE ANDERSON

Recognition of outstanding achievements cited at Detroit meeting by Chairman J. W. Anderson as . . .

T&D Committee Awards Scroll to H. P. Seelye

Howard P. Seelye, Detroit Edison's manager of engineering and former chairman of the EEI Transmission and Distribution Committee, was awarded a scroll at the committee's recent meeting at Detroit. The scroll cited his outstanding achievements during nearly 40 years as engineer, leader, and friend.

Seelye in his acceptance speech urged utility engineers to:

1. Prepare for continued growth to double capacity every ten years.

2. Extend higher voltages closer to concentrated loads.

3. Give better voltage and service reliability without boosting cost.

4. Improve appearance of overhead plant and develop cheaper underground methods.

Emergency Aid Group Reports . . . Objective of the new task force on mutual assistance between utilities, reported Chairman D. F. Tulloch, Boston Edison Co, is to ascertain whether a national plan is necessary. Such a plan would include a national roster of utility representatives authorized to participate. It might also set up EEI as the national coordinating agency. The program includes:

1. Determining which utilities already participate in regional plans with rosters.

2. Investigating features of each regional plan and its provisions for aid to non-members.

3. Seeking utility agreement to participate in a national roster.

4. Establishing procedure for the roster.

5. Determining whether plan should include underground plant and generating station personnel.

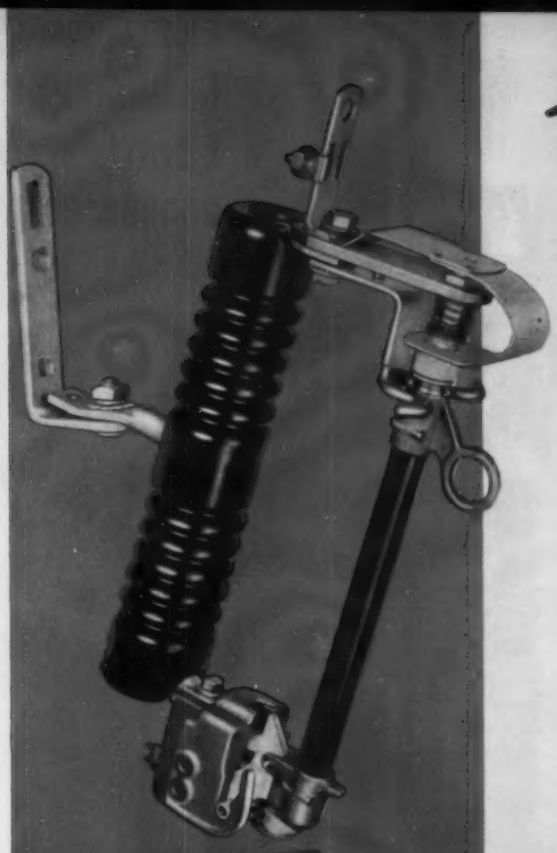
6. Investigating how to allocate help among several requests.

7. Determining part to be played by utilities in a stricken area.

8. Exploring practices for preparing, mobilizing, and transporting crews, supervision; standards; and housing.

The aim would be to preserve the person-to-person contacts which feature present regional plans.

(*Continued on page* 25)



New Easy Way to select cutouts

S&C's new XS Cutout carries short circuit interrupting ratings on a symmetrical basis, greatly simplifying calculations needed for cutout application. Predicated on known circuit characteristics, the symmetrical ratings match performance requirements at protection points.

Type XS Cutouts interrupt 4000 amp symmetrical (7.5 kv) and 3300 amp symmetrical (15 kv) at (1) sectionalizing points on distribution feeders, (2) distribution transformers, and (3) pole top capacitor banks . . . where the X/R ratio to the point of the fault is 4 or less. Cutout selection thus becomes direct and positive . . . conversion of fault currents from known symmetrical value to elaborately calculated asymmetrical values is no longer required.

Note that these ratings, which equal heavy-duty cutout performance, come at standard-duty cutout cost. It will pay you to obtain complete information on the Type XS Cutout contained in S&C's new Catalog Section 511.

Amperes, RMS		
Cutout Voltage Rating Kv	Asymmetrical Latest NEMA Std.	Symmetrical Alternate Suggested Std.
7.5	5000	4000
15	4000	3300

NEW SYMMETRICAL RATINGS SAVE TEDIOUS CALCULATIONS

S&C ELECTRIC COMPANY

4427 RAVENSWOOD AVENUE
CHICAGO 40, ILLINOIS, U. S. A.

IN CANADA:
S & C ELECTRIC CANADA, LTD.
8 Vansco Road, Toronto 14, Ontario

POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

Specialists in High-Voltage Circuit Interruption

EXPANDED RANGE OF KV RATINGS

W. J. Rudge, Manager Lightning Arrester and Cutout Engineering, foreground, and R. T. Morris, Manager Lightning Arrester and Cutout Sales, background, inspect expanded range of ratings of General Electric's all-new Line-type Arresters.

ALL-NEW SERIES OF LINE-TYPE ARRESTERS

NEW! Expanded range—ratings 3 through 121-Kv

NEW! 20% better protective level

NEW! Magne-valve action in line-type arresters

Here is General Electric's new series of THYRITE* Magne-valve line-type arresters—revolutionary in design, exceptionally high in co-ordinated protective efficiency and in endurance. Seven new standard arrester ratings have been added to broaden the new line from 3 through 121-Kv.

Exclusive Magne-valve action is the key to the superior performance characteristics of this new arrester. This is accomplished by *magnetic* action of the series gaps aided by *valve* action of improved Thyrite valve disks. Already successfully applied to G.E.'s new THYRITE station-type arresters, and thoroughly proved since 1950 by thousands of service operations, Magne-valve action now applied to new line-type arresters means far higher reliability. For example:

BETTER PROTECTIVE LEVEL—Has 10% lower impulse sparkover voltage and 20% lower IR discharge voltage (see graph below)—representing a degree of protective efficiency *heretofore unobtainable in any line-type class of lightning arrester.*

LIBERAL DISCHARGE CAPACITY—Easily withstands the industry-standard long duration current test, as well as the industry-standard high current test of 65,000 amperes (5x10 ms wave).

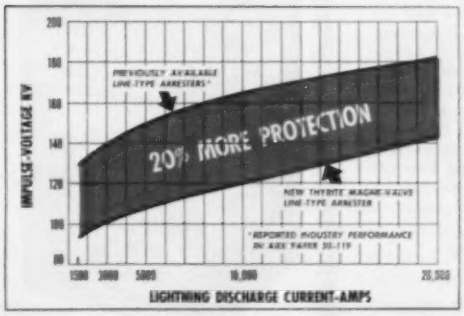
MORE STANDARD RATINGS FOR MORE APPLICATIONS—At numerous small or medium sized transformer substations, or switching substations, small sizes of metal enclosed switchgear (where limited space has heretofore been a problem), and at load centers.

G.E.'s new series of Thyrite Magne-valve line-type arresters is already a service-proven product available for your system. For full details, including performance data, check your nearest G-E Apparatus Sales Representative or write to General Electric Company, Schenectady 5, New York. Ask for Bulletin GEA-2978. 433-12

*Registered Trademark of General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC



20% MORE PROTECTION compared to latest industry performance characteristics.

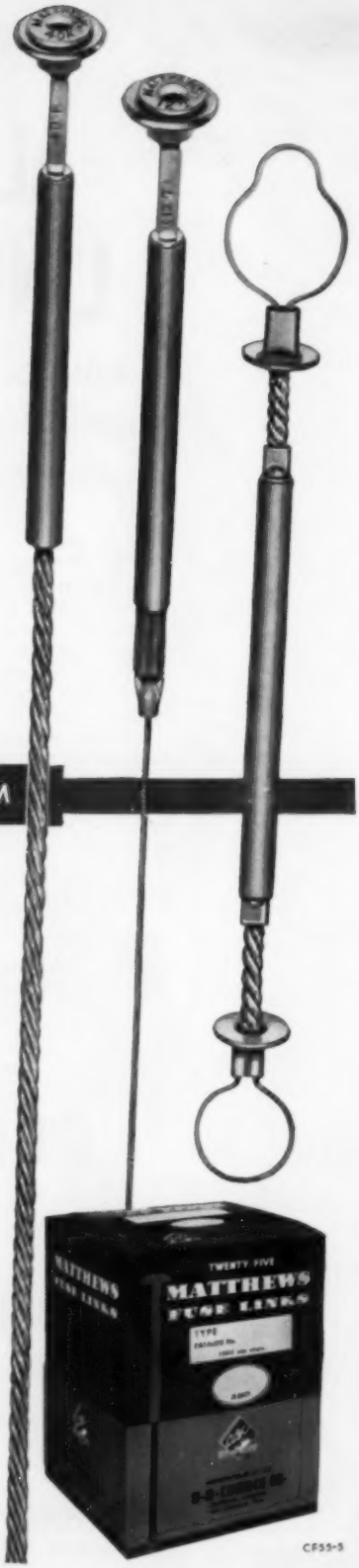
GAP UNIT with magnetic coil and pre-ionizing elements interrupts arc in less than half a cycle.

LOOSE GRAIN IMPULSE TESTING under pressure assures uniform quality of Thyrite disks.

FAST OR SLOW

...here's coordinated system protection without unnecessary interruption

MATTHEWS K&T Fuse Links



These NEMA Standard fast or slow Fuse Links have the uniform quality vital to proper coordination.

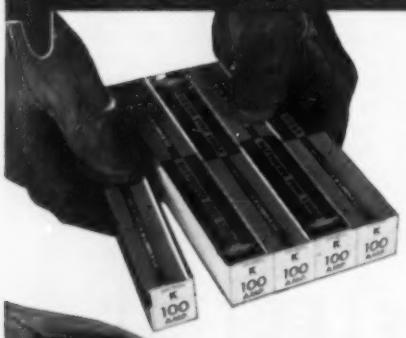
Auxiliary tubes are used on links through 100 amperes for positive circuit interruption of low fault currents. They also protect the fusible element from damage.

Low amperage links (20 amps and below) are fitted with a stainless steel push-out spring for added assurance of low fault current interruption.

Flexible cables are lead-coated for maximum resistance to corrosion.

Easy to use time-current curves are available to help you plan your coordination.

PACKAGED THE WAY YOU ASKED FOR THEM



An overwhelming majority of power companies, in response to a survey, asked for fuse links to be packaged and identified like this! Links rated 100 amperes and below are packaged in sturdy 5-link containers. Links over 100 amperes come in 3-link containers. Each of the joined packages is a container in itself. Perforation permits easy, immediate separation of each unit.

Lineman can easily pull out a link while wearing gloves. For convenience, five 5-unit containers (25 links) are packaged in a carton and three 3-unit containers (9 links) come in a carton. Everything, including the link, is clearly identified. Each link is stamped to show type and rating. Link type and rating is printed in big type on both ends of each single unit container. The large shelf package also clearly shows type, catalog number, rating and time-current characteristic curve numbers.

ABC INDUSTRIES

A·B·CHANCE CO.

CENTRALIA, MISSOURI

SAN FRANCISCO, CALIFORNIA

Seelye Cited by EEI

(*Continued from page* 20)

Suggest 254/440 for New Service Voltage . . . Suggestion of 254/440 as a standard by the task force on higher secondary voltage raised hopes for a single standard of residential and commercial service. Such a voltage, they reported, would permit direct supply to present 240-v appliances, and the Y voltage should suffice for most 440-v motors. The new value is a compromise between 265/460 (considered a more suitable designation than 277/480), already the trend for commercial and industrial buildings, and 240/416 which most nearly satisfies home appliance requirements.

The new voltage elicited prompt and enthusiastic support from W. R. Bullard, Ebasco Services. He urged promoting 250-v outlets in today's wiring to encourage use of 240-v appliances. Then the new voltage could gain acceptance as "a gradual drift", he said, rather than a countrywide conversion.

A statement read by R. F. Lawrence, Westinghouse Electric Corp. predicted use of higher service voltages for both residential and commercial; it urged a single standard for both. And a surprise switch by D. K. Blake, General Electric Co, added unexpected support, but at 277/480 v to boost torque from 440-v motors. The 277/480-v level also was endorsed by E. A. Rothfus, Commonwealth Services, and A. D. Caskey, Commonwealth Edison Co, for commercial service; both implied little prospect for residential use.

Seek Recloser Standards . . . Mechanical and electrical characteristics, maintenance requirements, and recommendations for lightning protection and bypassing will be considered in efforts to prepare standards for reclosers, advised E. T. Coupal, Niagara-Mohawk Power Corp. Objective is to publish a guide for the operators of these devices, he said.

Tests of protective systems for 12.5-kv distribution and for open-wire telephone circuits indicate that coordination is possible. The major problem is drawing enough fault current to trip large reclosers. But this can be overcome by using heavy-duty telephone protectors and by interpreting the National Electrical Safety Code to permit burning off telephone wires. These were the general conclusions offered by J. C. Slothower, Northern States Power Co, in a joint paper with E. G. Albrecht, Northwestern Bell Telephone Co.

Selenium rectifiers have been used in Detroit to serve isolated dc loads from ac networks, reported J. E. Mulavey and F. B. Holst. Reason for the installations is an attempt to curtail dc system investment as its load declines. But voltage regulation of 11.6% has proved troublesome. Another installation using ignitron rectifiers required the addition of shunt resistors to absorb regeneration from elevators, they said.

Seek Economic Limit to EHV . . . Detroit Edison's objective in transmission voltage is to seek the economic limit, said L. W. Clark. Present top voltage on the system is 120 kv, but continued growth and right-of-way difficulties point to lines of greater capacity. Clark reviewed experience at 380 kv in Sweden and designs for that ultimate level in other European countries as implications that EHV transmission can prove successful in this country.

Predicted load trends within the next 20 years will also demand cable to operate at 230 kv or higher, observed L. I. Komives, also Detroit Edison. He noted that highest levels for cable in the United States fall in the 100 to 150-kv range but that several European installations operate at voltages up to 400 kv. To prepare for extensive use of higher voltage cable, he urged participation in a $500,000 research program.

Discussion centered on how to extend useful transmission distance beyond the point at which charging current equals cable ampacity, expressed by several as 25 miles. One manufacturer's engineer suggested use of loading reactors; another offered dc transmission.

Build 115-Kv Over Railroad . . . Extension of 115-kv transmission to a new substation in Buffalo required use of railroad right of way for the final three miles, reported C. C. Wiedemann, Niagara-Mohawk. Restrictions imposed by the railroad required 50-ft vertical clearance over rails to steel members and 61-ft to conductors. Horizontal clearances were 33 ft to structures from rail center line. And the line had to be erected without blocking railroad operations.

Installation procedure for aluminum-sheath aerial cable subtransmission in Buffalo was described by C. T. Nicholson, also Niagara-Mohawk. Unusual stiffness of 350-MCM compact-sector copper conductors and the 2.5-in. sheath permitted suspending the cable at 10-ft intervals on hangers from a ⅜-in. HS steel messenger. Splices were enclosed with welded bells and sleeves, reinforced by strain bars held in cable clamps. In discussion, Nicholson added that normal loading will be 10 Mva with 14 Mva permitted in emergency.

A unique cable problem in Rochester has been creepage of cable in a duct under heavy traffic. Several attempts to restrain the movement have been unsuccessful, said G. H. Fiedler, and forces up to 500 lb have been measured.

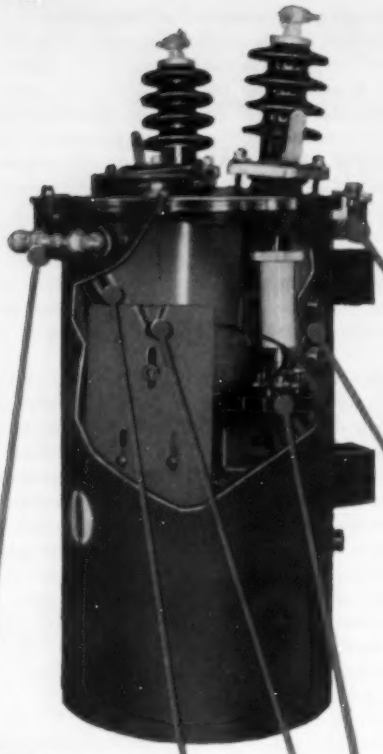
In discussion, H. L. Davis, Jr, Philadelphia Electric Co, noted that reported cable failures reached their peak in 1953 with 21% attributed to movement. Other causes were corrosion 23% and mechanical interference 22%.

Most frequent question in pole maintenance is what to do with poles removed because of line changes, said M. S. Hudson, consulting chemist. Usual procedure, he said, is to inspect for evidence of damage, sound for cavities with a hammer, probe for softness at the ground line, and check increment borings for crumbling and creosote retension. But a new method pulverizes the sapwood portion of a boring, extract the creosote with solvent, and determines retention by comparison with samples.

More accurate knowledge of wood pole strength would permit economies through use of smaller poles, said L. J. Jacobi, Detroit Edison.

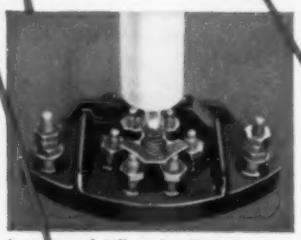
Promote Operating Safety . . . Safe and efficient field construction is the objective of Commonwealth Edison's new job-briefing program, said R. F. Stone. In the first program 350 foremen were trained to plan work and to instruct their personnel by objective questioning. The program is planned to instruct and provide practice for all levels of supervision. Plans call for extending the program to substation and generating station personnel, added Stone in discussion, and then to start a refresher program.

NEW KUHLMAN FEATURES

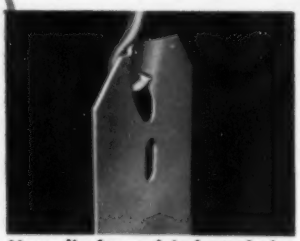


Low voltage bushings, and studs keyed to prevent rotation, eliminate all possibility of internal short circuits. Bushing connectors are designed for three way entrance of low voltage leads . . . from above, below, or front.

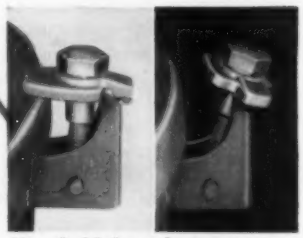
New crimped connections guarantee pullout values equal to 85% of the cable tensile strength and greater than 100% relative conductivity.



Improved "floating" action tap changer maintains positive pressure on both contacts by a spring actuated self-aligning mechanism.



New die-formed indented slot in core clamp allows greater lifting hook clearance for ease in handling or removing core and coil assembly.



New hold down bars and nuts of forged brass maintain a uniform pressure-seal on transformer tanks . . . are not subject to rust or corrosion . . . do not have to be disassembled to remove cover as illustrated above (right).

Provisions for mounting either valve or expulsion type arresters are made on all Kuhlman transformers built to EEI-NEMA standards through 100 KVA single phase and 150 KVA three phase.

KUHLMAN

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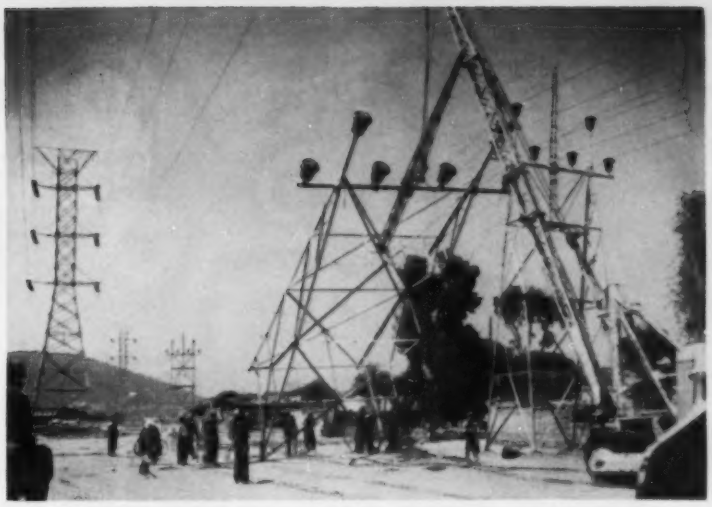
KUHLMAN ELECTRIC COMPANY, BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA



Once World's Longest Transmission

World's longest transmission line when it was built 50 years ago to span the 85 miles from Nexaca to Mexico City is being dismantled. Mexican Light & Power Co has erected a new 220,000-v line to replace the old 85,000-v line. Half of the 1,000 steel towers supporting the old line in two rows will be torn down; the others will continue to serve Pachuca and its mining area.

Puget Sound Utilities . . .

. . . consider Stevens' recommendations to spend $670-million for 760,000 kw generation, other facilities by 1964

Members of the Puget Sound Utilities Council must invest a minimum of $670 million in new generating, transmission, and distribution facilities by 1963-64 if they are to meet the growing demands of the region, Consulting Engineer Jack D. Stevens of Seattle, Wash., has recommended in a report prepared at the council's direction.

The program, as outlined in a 150-page report summary released by the council, would provide an estimated 760,000 kw of new generating capacity to carry a peak load of 3.3 million kw, an increase of 1,730,000 kw over the 1954-55 peak. Balance of the load growth would be supplied by firm purchases of federal power and new council generating capacity now under construction, Stevens stated.

Members of the council are the Puget Sound Power & Light Co, Tacoma and Seattle City Light Municipalities and the Chelan and Snokomish County PUD's, all operating in Washington state.

In addition to constructing 760,000 kw of new generation, the council also should "consider fundamental policies affecting a much greater load level which could develop if encouragement were given to special, large power-using industries," Stevens stated.

Projects now under investigation or proposed for investigation by the council are more than adequate to meet the council's needs in the next ten years, Stevens said. These include the proposed 2.7 million kw Mica Creek storage project on the Columbia River in British Columbia, described by Stevens as "the most outstanding single project now known in North America," and the proposed Rocky Reach Dam on the Columbia River.

Other proposed projects are Seattle City Light's Boundary Dam on the Pend Oreille River, Tacoma City Light's Cowlitz and Skokomish River developments, and the Puget Sound Power & Light Co's further development of the Baker River.

Referring to Mica Creek, Stevens recommended: "When a satisfactory formula for the allocation of prime power is devised by the BPA, the council should submit a firm proposal to British Columbia whereby the council would finance (construction of the dam, estimated by the Canadian government to cost $250 million)."

Stevens predicted that council members, now purchasing about one-fourth of their energy requirements from the BPA, would increase these purchases in the future. He added that "a number of federal policies affecting future contracts with the council should be more precisely defined" and that "federal policy should be modified to remove contract limitations upon council members to cooperate jointly."

He cited the following as among the policies needing definition:

- Federal contributions to costs for navigation, flood control, and other non-power features incorporated in non-federal multi-purpose projects.
- Federal contributions to the cost of jointly used facilities of non-federal multi-purpose projects.
- Payments by the federal government to non-federal plant owners for storage benefits received from storage releases made at non-federal projects.
- Extent and methods of integrating non-federal plants hydraulically and electrically with the federal system.
- Arrangements for federal delivery of non-federal power, including the extent of federal construction to deliver non-federal power.

Stevens found present load estimates of Northwest utilities to be "unrealistically low," in that they are based on an estimated annual rate of growth about the same as the estimated rate for the entire United States. Since the area will rank "among the fastest growing sections in the United States" for at least the next two decades, Stevens recommended that an intermediate load level be adopted for power planning.

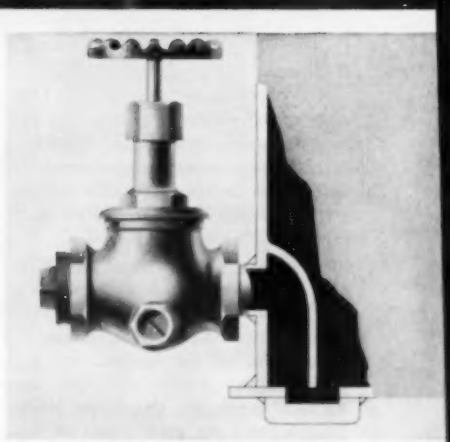
De-Generating Session

A mute mike twice delayed a session of the recent national conference of the American Society of Mechanical Engineers in Baltimore, Md.

Cause of trouble: Power failure.

Session subject: Generating electric current.

WSB tap changer—one tap change with each revolution of operating handle.



Drain valve arrangement—assures complete drainage, damage protection.

Improvement program builds extra value into standardized power transformers

Simplified installation, reduced maintenance, improved performance—these are the results of the broad-scale improvement program for Westinghouse standardized power transformers. Here are some outstanding examples:

Instrument and accessories—more readily accessible, easier to read from any angle, completely protected by tank braces.

Four-way sled runner base—for easier handling. Cast steel lugs welded to the base prevent digging into wooden rollers—provide means for attaching towing cables with a standard clevis.

New valve arrangement, combined with tank sump, assures bottom sampling and complete oil drainage. Valve is placed above tank base for protection in shipping and handling and to avoid interference with tank welds.

New RJ bushing for voltages 15 kv and below. Features a flange rolled into two grooves cut in the porcelain and sealed by silicone rubber gaskets. So supported, bushings cannot crack due to uneven tightening in assembly or from stresses of normal operation. ASA standard bushings furnished for voltages above 15 kv.

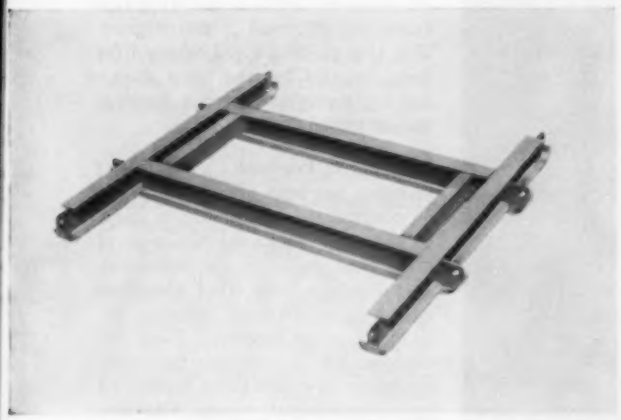
WSB tap changer, now provided on all standardized power transformers, insures proper centering of contacts through a Geneva gear action requiring one complete revolution for each tap change. Button contacts are self-cleaning—arranged to provide parallel current paths to obtain maximum contact pressure during fault currents.

"Coastal Finish"— now used on all standardized power transformers. Provides an armor coat of mica flakes that insures complete protection under all operating conditions.

For still more dollar-saving details on Westinghouse standardized power transformers, call your Westinghouse sales engineer or write for B-5914, "Standardized Savings", Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

J-70750

YOU CAN BE SURE...IF IT'S Westinghouse

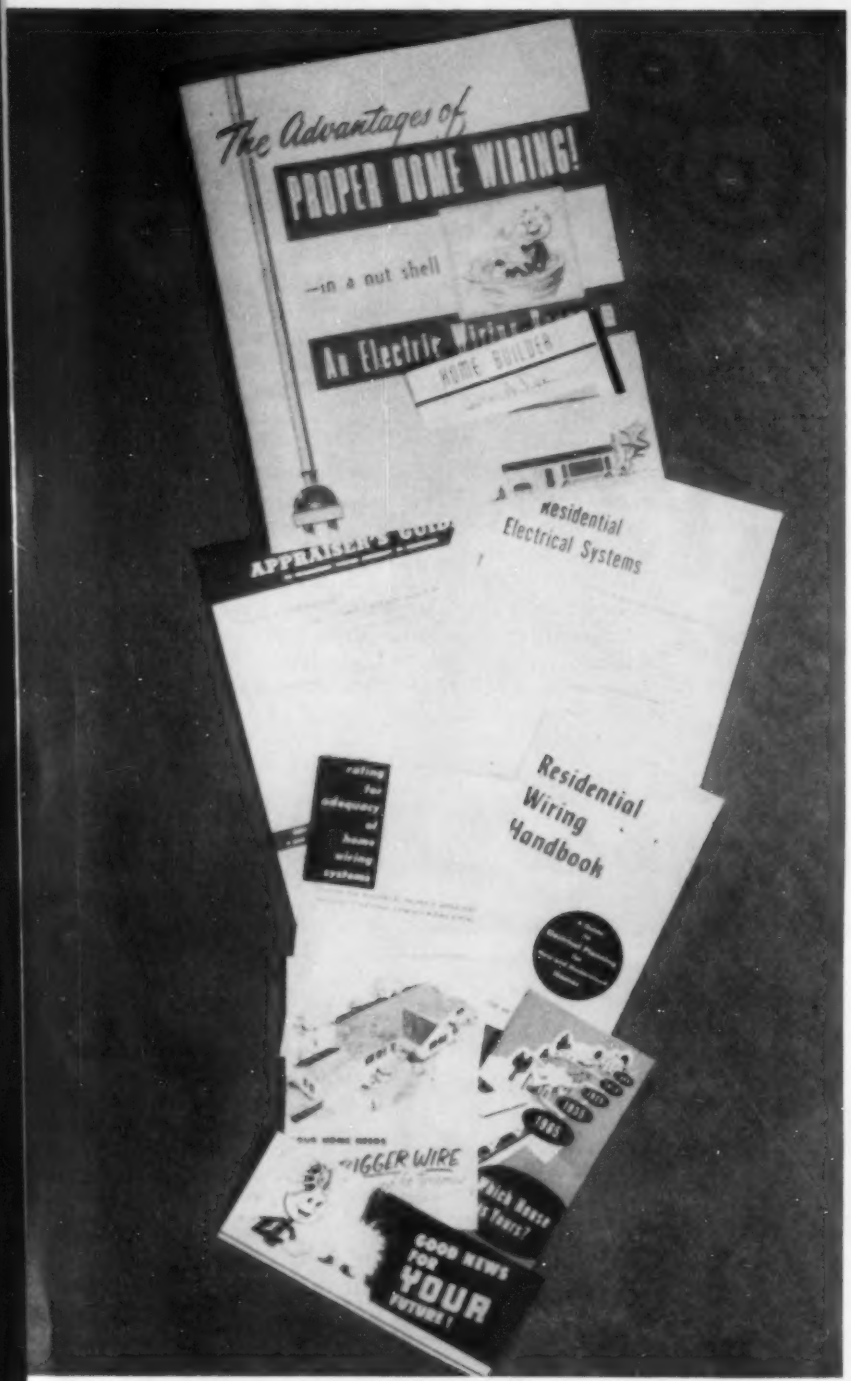


4-way sled runner base—simplifies handling, provides means for attaching towing cables with a standard clevis.

RJ bushing—rolled flange design prevents cracking in installation or from stresses of normal operation.

Everyone Benefits From Adequate

Here is a program that is aimed at such groups as appliance dealers, home owners, architects,



Promotional pamphlets are provided for the different groups

THOMAS LYNN, Lighting Specialist, Southwestern Public Service Co, Amarillo, Texas

Everyone benefits from adequate wiring, so everyone should know about it. This is the philosophy behind the year-long AW promotion of Southwestern Public Service Co, Amarillo, Texas. The coordinated program is aimed at seven groups: Electrical distributors, real estate dealers, architects, home builders, electrical contractors, mortgage grantors, and appliance dealers. Cost is estimated at $85,000.

The AW promotion is aimed primarily at dual targets—existing homes with two-wire services and new homes that are being wired inadequately or for only two-wire service. Although the scope of the first target has not been fully covered, Public Service feels there are too many existing homes not wired adequately. A check showed 10% of new homes are going two-wire.

Program Is Long-range . . . Designed as a long-range educational and informational project, the AW program will run through 1955. Further activities will be added or adapted to continue the program in the future. One encouraging factor is the availability of financing for wire-on-time installations. This financing is offered by banks and other lending agencies.

The AW promotion started November 1954 with meetings scheduled to acquaint company personnel with the program. All divisions were contacted and informed of the program. This year brochures and folders have been prepared for the seven groups and are presented at group meetings and on personal visits.

Brochure Is Provided . . . A master brochure has been designed that can be personalized by inserting a folder in the cover indicating the type of group and name of the individual. This brochure, plus other pamphlets on wiring, is the basic working material for group meetings. These discussions, led by company personnel, emphasize how each group benefits by promoting adequate wiring. Fifty employees throughout the service area are engaged in the AW promotion.

Wiring

realtors, and others concerned

Also used at meetings is the 20-min color sound film, "The Magic Link," produced for Consolidated Edison Co of New York, Inc.

The promotion has been well received at nearly all the group meetings. One interesting aspect is that no opposition has arisen to the standard of 100-amp minimum service for new and rewired homes. However, an aggressive selling job is needed to get action on this minimum standard. Interest also has developed in electrical codes in some smaller towns and establishment of certified wiring bureaus in others.

Program Backed by Advertising . . . Personal calls on individuals among each of the seven groups follow group meetings. The company offers the complete services of its adequate wiring departments for consultation, advice, and assistance.

A long-range advertising campaign backs up the wiring promotion. During 1955, one newspaper advertisement a month in the company's regular schedule of 75 newspapers will be devoted to wiring. One radio spot announcement a week is scheduled on three stations, and one television spot a week will appear on 28 stations. Company offices carry displays and have folders available for direct distribution to customers. To inform the general public of adequate wiring, Public Service is providing wiring booths for home shows.

Program Considered Successful . . . Although the program has just started, Public Service considers it successful so far. Electrical contractors benefit by the promotion. Many have started tie-in advertising and are using promotional materials to turn up wiring jobs in existing homes. Some contractors now advise changing from No 14 to No 12 conductor for all residential circuit wiring, except where larger conductor is needed. They report that builders have approved this change. Contractors who have used promotional materials, mailing materials, and TV or radio advertisements have been encouraged by the number of replies and requests for adequate wiring.

Such signs please realtors and call attention to new homes

Distributors see how AW promotion helps sell adequate panels

Appliance dealers learn what AW means in terms of appliances

NW Power High Spots:

- **McNary becomes 2nd biggest producer in federal system**
- **'Parade of Dams' set for June with 3 project dedications**

McNary Dam powerhouse on the Columbia River has moved into the No. 2 spot for hydroelectric capability in the federal generation system in the Pacific Northwest as the Army Corps of Engineers prepared to dedicate three other multi-purpose projects in as many days in June. Ceremonies will be keyed to the Corps' 180th anniversary.

Addition of McNary's eighth 70,000-kw generating unit boosted the name-plate rating at this project, dedicated last year by President Eisenhower, to 560,000 kw, compared to a Bonneville powerhouse nameplate rating of 518,400 kw. Still No. 1 giant, of course, is Grand Coulee with a rating of 1,944,000 kw.

Currently, the McNary generators, on the basis of the overload factor and the favorable streamflow now beginning to rise for freshet crests expected in June-July, are feeding 644,000 kw into the Northwest power pool. When McNary has all 14 units by end of 1958, it will have a capability of 1,127,000 kw.

The Corps has labeled its dedication plans for June the "Parade of Dams," and on tap for the speaking engagements, along with governors of Idaho and Oregon, is Assistant Army Secretary George H. Roderick.

The $140-million package of multipurpose civil works construction represented by the projects to be dedicated next month comprise 177,600-kw increment in the hydroelectric installation for the region, important segments of flood control, and reclamation-irrigation programs for major river basins in three states.

First on the schedule is the $20-million Lucky Peak Dam on the Boise River near Boise, Idaho, a flood control and irrigation development to be dedicated June 23. Lacking power installations, the structure does have provisions for future generation.

Next is Albeni Falls Dam and the powerhouse on the Pend Oreille River near the Washington-Idaho border in northern Idaho. There on June 24, Assistant Secretary Roderick will join Col L. H. Foote, North Pacific Division engineer, and local leaders in dedicating the $31-million, 42,600-kw project.

The $89-million Lookout Point project, which includes the main dam and powerhouse and the re-regulating Dexter Dam on the middle fork of Oregon's Willamette River, will be dedicated in the windup on June 25. The third of the three 40,000-kw generators at Lookout Point went on the line in April. A 15,000-kw unit at Dexter Dam is scheduled for testing sometime in May.

CL&P Builds Home for 100,000-kw Unit

The new building shown above is being constructed by Connecticut Light & Power Co to house a 100,000-kw turbogenerator—the largest in New England.

The site of the out-sized installation is adjacent to CL&P's steam plant at Devon, near the mouth of the Housatonic River. Scheduled for operation early next year, the new unit will boost Devon's capability to 378,700 kw.

New Oregon Unit...

...eliminates fish commission veto power over hydro development plans

Creation of a new water resources board by the 48th biennial Oregon legislature has provided a seven-man, state policy level organization which investor-owned electric utilities may find more favorable to their hydroelectric problems than in the past.

Sports and commercial fishing interests, principally concerned with preserving salmon streams and spawning tributaries, have posed serious—and at times insurmountable—barriers to dams on Oregon rivers. Whether the new seven-member board will dictate a more favorable climate remains to be seen, but utilities' representatives seemed in agreement that the removal of veto power of the fish commission would give hydro plans a chance.

Backers of the legislation, resulting from a two-year interim committee study, have called the law "revolutionary" in its scope and impact by creating a means of resolving conflicts which have hampered various developments.

Fishery interests which have, through the fish commission, held veto power over the hydroelectric commission in the past fought the change but in the end had to be satisfied with a policy statement in the bill which in itself may help resolve conflicts.

This recognizes the fishery resource as "an important economic and recreational asset" and adds that "due regard shall be given to means and methods for its protection."

The legislation eliminates the Willamette River Basin Commission, which has worked for the multipurpose Army Corps of Engineers' 19-project program; the Upper Columbia Basin Commission; the Reclamation Board; and the Irrigation Board.

L-M's new Luminaire Supports will hold a 250-pound man!

Here's the first complete line of brackets designed specifically to meet customers' requirements for strength, *minimum pole space* (less than the rise of the bracket), and handsome appearance.

Obviously we didn't design them for a gymnasium—but they *are* strong enough so that even the extra-long 20-footers will support a 250-pound man, if he should accidentally put his weight on the end of the arm. Pole plates and tension support members are all welded to the unit to insure ample strength throughout the entire assembly. These designs have all been wind-tunnel-tested for winds up to 150 MPH to assure generous lateral strength.

Pole space required is only one inch per foot of bracket length—except on A-frame brackets, which require not over 1.6 inches per foot. In other words, a 10-foot bracket requires only 10 inches of pole space. The 20-foot A-frame bracket shown above requires only 30 inches of pole space. Installation instructions are marked directly on the support arm.

Units are easy to handle, install, and wire. The entire line is related in appearance so that you can use several types in the same installation, if desired. All types are available in galvanized steel or aluminum; choice of plain, threaded, or street-ell end styles.

Four harmonizing styles of supports, available in various lengths up to 20 feet, in steel or aluminum. Get details on sizes available in each style.

Upper photo: Strong pole fitting has ample strength; held by ⅝-inch thru-bolt and 2½-inch lag screws. Lower: welded support for braces adds strength, minimizes vibration.

Get Complete Information on L-M Street Lighting Application Service

These are the only brackets that have all three advantages—extra strength, minimum pole space, and handsome design. L-M also offers a full line of street lighting luminaires—incandescent, mercury vapor, and fluorescent—and complete street lighting application engineering service. Ask the L-M Field Engineer for information and bulletins. Or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

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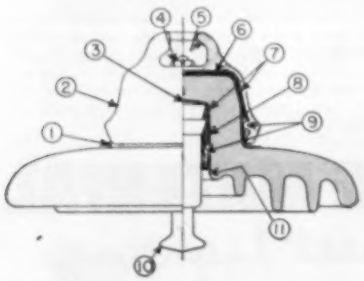
LINE MATERIAL
Street Lighting

Triple-Tested...

Stainless steel pin, for use in high-contamination or coastal areas. Available in all suspension insulators on special order.



One of Illinois' outstanding porcelain products is this 10-inch suspension insulator. The cutaway view shows some of the features that assure quality.

1. Ample clearance between edge of cap and top of porcelain shield.

2. High-grade malleable cap, treated to prevent embrittlement when galvanized. Forged steel cap also available. Galvanizing is closely controlled in our own plant.

3. Treated fibrous washer provides a cushion between end of pin and porcelain.

4. Spring brass cotter key.

5. Smooth socket, accurately manufactured to standard dimensions.

6. Resilient compound provides cushion between bottom of cap and top of porcelain.

7. Resilient compound applied on inside of cap and outside of pin.

8. Sanded surfaces (controlled particle size).

9. Cemented joint between hardware and porcelain is neat portland cement.

10. Forged steel pin, accurately gauged to standard dimensions. Also available in stainless steel for use in high-contamination or coastal areas.

11. Radio glaze treatment available if desired, though these insulators meet satisfactory radio noise-level requirements without treatment.

Illinois Electric Porcelain... Triple-Tested To Insure Extra Mechanical And Electrical Strength

1 Complete laboratory control of materials.

2 Extensive new quality-control system.

3 Rigid final testing.

All combine to insure extremely high quality in the finished porcelain insulators.

by **W. V. SWAN**, Vice President
Illinois Electric Porcelain Company

In the two years that Illinois Electric Porcelain has been under Line Material Company operation, we have made extensive changes, from one end of the plant to the other.

A completely new ceramic laboratory has been built, containing the latest equipment for testing raw materials and production methods, and for developing new tests to assure customers that they will get insulators of extremely high quality.

Accurately Controlled Production

The latest precision production machinery has been installed. New, accurately controlled molding, pressing, drying, glazing, and firing equipment assure much more uniform production, and porcelain of greater uniformity in density and strength.

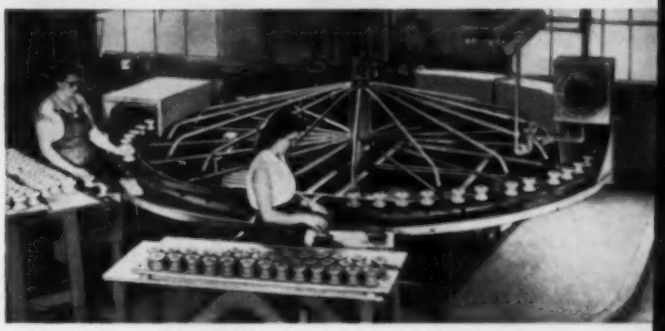
Our facilities include our own completely new, modern galvanizing plant for insulator hardware and fittings. This assures accurate quality control under our own supervision.

Amply Meet EEI-NEMA Standards

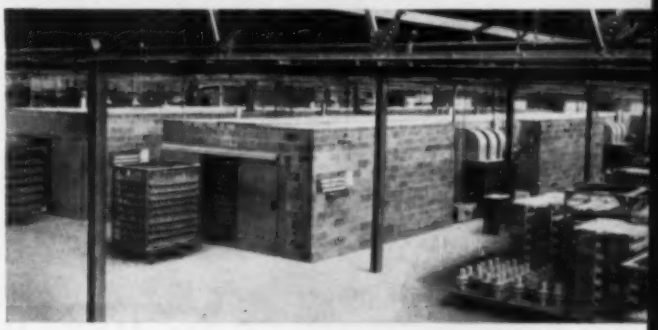
The result is that, today, porcelain insulators shipped from this plant are among the highest quality available in the industry. You can buy them with full assurance that you are getting porcelain insulators second to none. They meet EEI-NEMA standards with an ample margin of safety.

Get Complete Information

Illinois Electric Porcelain Company products include porcelain insulators, hardware, and fittings. These products are sold through Line Material Company. Ask the L-M Field Engineer for complete information, and a copy of the informative Bulletin DL8; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



Here's one of the newest developments at Illinois Electric. On this huge wheel, spool and pin type insulators and wireholders are automatically glazed on all sides and partly dried by warm-air circulation, insuring uniform, complete glazing.



Two huge automatic dryers gradually dry the formed porcelain. Heat and humidity are automatically controlled as the ware slowly passes through the dryers. This provides strong, dense ware, free from internal stresses.

Suspension insulators are subjected to simultaneous mechanical and electrical test to destruction—a test performed on a representative quantity of insulators to insure high quality.

A corner of Illinois' complete new ceramic laboratory. The laboratory contains the latest equipment for analyzing materials and testing production processes.

ILLINOIS ELECTRIC PORCELAIN COMPANY

(a McGraw Electric Company Subsidiary) • Macomb, Illinois

Distributed by **LINE MATERIAL** *Electrical Porcelain Insulators*

(a McGraw Electric Company Division)

A. B. SANBORN

G. R. McARTHUR

S. A. MOXNESS

J. F. BUCKMIER

Northwestern PS Makes Executive Changes

Northwestern Public Service has made several changes in its executive department.

A. B. Sanborn who had been the company's president since 1938 was elected chairman of the board. He will continue as the chief executive officer.

Succeeding Sanborn as president is G. R. McArthur. S. A. Moxness, manager of the company's Huron Division, was elected a vice president. J. F. Buckmier, treasurer since 1948, was made vice president and treasurer.

Sanborn graduated from U. S. Naval Academy in 1912. He served in the Navy until 1920 when he joined the East Kootenay Power Co of Fernie, British Columbia. In 1938 he came to the Northwestern PS as president.

After service in World War I, three years of farming, instructing in economics, five years of service as secretary-manager of South Dakota Chamber of Commerce, McArthur joined Northwestern PS in 1930 as director of employee and public relations. He was elected a director of the company in 1935 and vice president in 1938.

Moxness joined the company in 1933 as an accountant. He became chief accountant of company's Huron Division in 1934 and manager of the division in 1944.

Buckmier has spent his entire business career with the company, beginning with its organization in 1923. Previously he had been with the predecessor company, Aberdeen Light & Power Co. He became treasurer in 1948.

ELDRED H. SCOTT

Scott, Hurns Made VP's

Detroit Edison Co has elected Eldred H. Scott and Thomas E. Hurns vice presidents of the company. Anthony G. Maihofer has been made superintendent of taxes and Henry J. Sullivan, assistant to the president.

Scott joined the company in 1924 and was appointed controller in 1953. He will continue his duties as controller in addition to his duties as vice president.

Hurns, who will retain his present office of secretary and general accountant, first started with company in 1909.

Maihofer began with the company in 1923 and Sullivan started in 1926.

THOMAS E. HURNS

Maryland Utilities Elect Nelson

George M. Nelson, president of Eastern Shore Public Service, and vice president of Delaware Power & Light Co, has been elected president of the Maryland Utilities Association.

After receiving a B.S. degree in electrical engineering, he began his professional career in the engineering department of the Pennsylvania Railroad Co and continued in similar work with the Philadelphia Electric Co. He came to Eastern Shore PS in 1926 as right-of-way agent. Two years later he became assistant superintendent of operations. In April 1935 he was made superintendent of operations and in 1946 he was elected vice president and general manager.

G. M. NELSON

POWERS *American*®

presents the

"Sky-Master"

HYDRAULIC AERIAL BEAM

THE ULTIMATE IN AERIAL EQUIPMENT

IN TWO SIZES... FOR ALL TYPES OF OVERHEAD WORK

SKY-MASTER carries two men . . . in reinforced plastic work baskets . . . to *any* point within its wide range of movement. The supporting mast, which rotates on roller bearings, can be revolved continuously . . . in either direction. The hydraulically-actuated inner beam can be moved to any point in an 85° arc, and the outer beam—actuated in combination with drive pulleys and ¼" wire rope—can be spotted in any position within a 265° arc. Movement of the beams and mast is controlled by three independent levers beside the work baskets.

Hydraulic outriggers, on each side of the body, furnish absolute stability regardless of SKY-MASTER'S position. Insulation against 50,000 volts is provided by an abrasion-resistant covering on the outer beam.

Operating features and construction details are described in Powers-American Bulletin No. 410. A copy, with price information, will be sent on request.

SKY-MASTER can be installed on a Powers-American Body which fits individual work requirements. SERIES AB-37 has a ground-to-basket floor height of 37', SERIES AB-43 extends to 43', enabling two men to work 48' above ground.

POWERS-AMERICAN DIVISION

McCABE-POWERS AUTO BODY COMPANY

5900 NO. BROADWAY • ST. LOUIS 15, MO. — 625 CEDAR STREET • BERKELEY 10, CALIF.

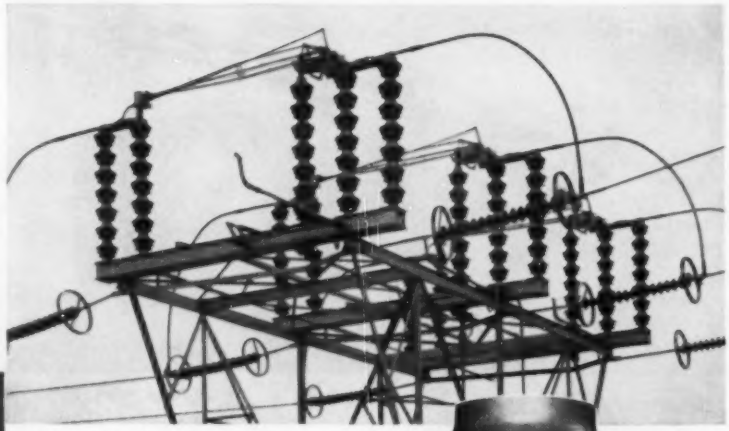
NO. 10 IN A SERIES

A SUB STATION DESIGN ENGINEER ASKS—

"we're interested in higher voltage switch and bus unit operation. Do you have a service record on 220 KV?"

HERE'S OUR ANSWER:

Yes sir! For example, these Pinco 735 units installed at 220 KV by a large eastern utility back in 1929. Operating conditions have been rugged, but these insulators in seven unit stacks have given *twenty-four years of continuous, trouble-free performance* . . . stacks of evidence that Pinco 735's are right *for* the job . . . right *on* the job!



(Right) Rugged porcelain—a balanced design with larger second and center shells—the extra strength and extreme accuracy of assembly . . . all contribute to the trouble-free performance of Pinco 735 switch and bus units.

(Left) Here's a close-up of one of our master jigs in which the 735 unit is assembled. This operation assures exact bolt hole alignment—also cap and pin mounting surfaces are within 3/10,000 of an inch of parallelism.

PINCO INSULATORS

RIGHT ON THE JOB—

See Pages 112 to 123 in Pinco Catalog No. 49 for complete electrical and mechanical specifications covering all Pinco Switch and Bus Insulators. Do you have a copy? If not, write us.

The Porcelain Insulator Corporation
LIMA, NEW YORK

Suspension Insulators . . . Clamps and Fittings . . . Switch and Bus Insulators . . . Distribution and High Voltage Pin Types . . . Guy and Tree Insulators . . . Special Procelain.

Southwestern G & E Gets New Treasurer

Southwestern Gas & Electric Co elected J. N. Watts treasurer at a recent meeting of the company's board of directors held in Shreveport, La. The election of Watts became effective on May 1. He succeeds H. L. Nickerson who retired on that date.

A native of Roanoke, Va., he has worked for the Southwestern G&E since 1928, with the exception of a three-year break of service. He began his business career in the accounting department. He was advanced to the position of general auditor in 1951. He was made assistant treasurer of the company in January 1955.

J. N. WATTS

Shumaker Becomes Penelec Manager

Pennsylvania Electric Co has appointed R. A. Shumaker Central Division manager for the utility. He was formerly Southern Division operating superintendent.

He began his utility career in 1922 in the Johnstown line department of the company, moving to Indiana as district engineer in 1929. He became general foreman there in 1933.

He was made district manager in 1943, returning to Johnstown as district manager in 1951. Shumaker has been Southern Division operating superintendent of the company since April 1952. He will make his headquarters in Clearfield, Pa. The division includes Clearfield, Philipsburg, DuBois, and Punxsutawney districts.

R. A. SHUMAKER

DAVID REA

EW Reassigns Rea and Long

David Rea, Northeastern editor of Electrical World, has been named Southeastern editor. His successor will be Allen A. Long.

Rea joined the staff in 1952 as an assistant editor. He was a distribution engineer for Seattle (Wash.) City Light after graduating from the University of Washington. Long has been an assistant editor since last November. After graduation from Virginia Polytechnic Institute, he worked as a substation engineer for Appalachian Electric Power Co. He left that company to get his journalism degree at Emory University.

A. A. LONG

PERSONAL BRIEFS

Cecil G. McVay, assistant manager of power production of the Potomac Edison Co has been promoted to manager of power production for the system. He assumes duties previously performed by Vice President Eugene Gordon who was recently elected vice president of the West Penn Power Co of Pittsburgh, Pa. These two companies are subsidiaries of West Penn Electric Co.

Henry B. Sargent, president of Arizona Public Service Co, has been elected chairman of the Electric Companies Public Information Program, succeeding Robert E. Ginna, executive vice president of Rochester Gas & Electric Corp, who served two years . . . Springfield, Ill., City Water, Light & Power Department has appointed **Wilbur L. Withrow** purchasing agent . . . **W. L. Chadwick,** vice president of Southern California Edison Co, has received a Man of the Year citation from the American Society of Mechanical Engineers' Southern California Section.

Owen E. Grinde has been named advertising and publicity manager for the Montana Power Co, succeeding Colin Raff, who has been named executive assistant to the president.

OBITUARY

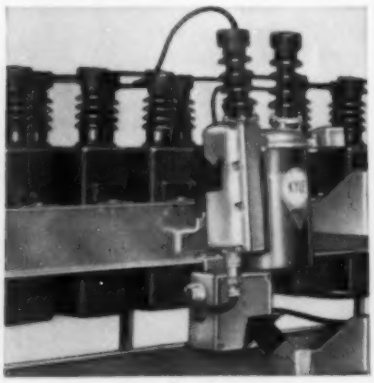
John B. Randall, 93, who developed General Electric Co's Nela Park plant in Cleveland, died on April 22 in Jamestown, N. Y. He became associated with a parent company of the present GE organization as an electrical engineer in 1886.

Henry A. Travers, technical consultant on calculating boards for Westinghouse Electric Corp until he retired in 1949, died on April 26. He was with Westinghouse for 43 years.

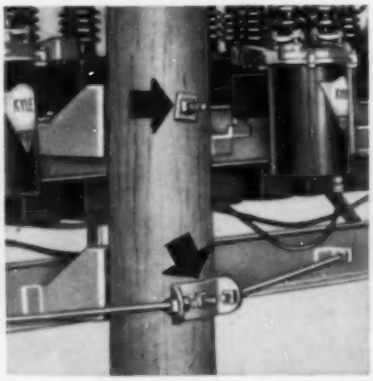
John W. Brooks, 79, senior vice president of Pass & Seymour, Inc, died on April 22 after a protracted illness.

L-M's new single-row switched capacitor rack hugs the pole, provides greater accessibility. Assembly is easier to install, inspect, and maintain.

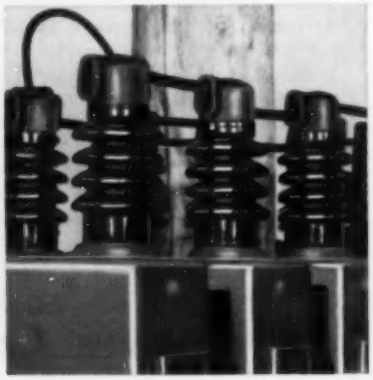
Junction Box: provides one connection point for control wiring; assures quick, easy installation and maintenance. Also note plug-in connection to switch control box.



Direct Pole Mounting: Only two bolts are required to mount L-M's single-row rack, greatly reducing installation time and pole space requirements.



Bird-Proof: an outstanding feature is the bird-proof construction. Neoprene rubber caps cover the terminals, and high-voltage connections are made with 5 kv insulated conductor.



Greater Accessibility, Less Bending Moment...

L-M's New Single-Row Capacitor Rack For Direct Pole Mounting

L-M's factory-assembled and wired, single-row capacitor racks are easier to install, inspect, and maintain. Center of gravity is close to pole, which reduces bending stress on pole.

Dependable Kyle® Switch: racks are supplied with L-M Kyle Type NR Oil Switches, 200 ampere thermal rating and full 150 ampere nominal capacitive rating at 15 kv.

By **N. K. DELANEY**
Manager of Capacitor Sales
Line Material Company

L-M's outstanding Elemex® capacitors are now available in single-row capacitor racks for direct pole mounting. The racks are factory-assembled and wired, shipped ready for installation on distribution systems rated 2400 to 13,800 volts. Bank sizes may be 225 or 300 kvar.

Single-Row Design

New single-row design provides greater accessibility; assures easier inspection and maintenance of the unit. In addition, L-M's new design brings the center of gravity closer to the pole, and thus reduces the bending stress on the pole.

Direct Pole Mounting

You can reduce installation time and pole space requirements with L-M's direct pole-mounting design. Direct pole mounting eliminates double hanger arm and kick arm. All you do is bolt to pole and connect.

Switched racks are provided with L-M's rugged, dependable, motor-operated "NR" switches. The switches are easily accessible for hook-stick operation. They are equipped with an exclusive plug-in connection for control wiring. This provides a quick, convenient means of disconnecting the switch for servicing.

Get Complete Information

Ask the L-M Field Engineer for complete information about L-M's new single-row capacitor rack and other capacitor equipments, also about L-M's Capacitor Bank Engineering Service. Or write Mr. Delaney, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Co. Division).

Other Features Of L-M's Single-Row Capacitor Rack Assemblies

- The single-row capacitor rack assembly incorporates many desirable features, assuring greater accessibility, dependable service. These include:
- Only one connection point for control wiring.
- Disconnect plugs on switches; switches can be easily removed for maintenance.
- Interchangeable switch mounting positions to meet various primary circuit configurations.
- Complete bird-proof construction; neoprene rubber caps on terminals, plus 5 kv insulated conductor for high-voltage connections.
- Lifting yoke; makes pole top hoisting easy.

L-M Offers Complete Line of Capacitor Equipments

Factory-assembled single-row or standard three-row racks for pole-mounted banks. Sizes with 15 kv spacing up to 300 kvar switched and 375 kvar unswitched assemblies with 25 kvar units.

Factory-assembled blocks in complete range of NEMA-standard sizes and ratings. Blocks save time and money in assembling large banks.

Metal-enclosed capacitor equipments in all NEMA-standard distribution voltage sizes and ratings.

VDS Method factory-assembled block for large multi-step capacitor banks at transmission voltages, an L-M-exclusive method that reduces cost of switching equipment.

LINE MATERIAL

Elemex® Capacitors

One-stop "shopping"

for your instrumentation needs!

WHATEVER your measurement and control problem . . . simple or complex . . . large or small . . . you'll find exactly the instrumentation you need in Honeywell's extensive, varied line of products.

What variables do you need to measure? This family of instruments covers temperatures, pressures, flow, frequency, power and practically everything that anyone would want to know about to supervise a process.

What accuracy do you require? Honeywell offers you a full selection, ranging from high-precision *ElectroniK* instruments to relatively simple protective devices.

Need control? You can choose from a line that extends from self-contained valve controllers small enough to hold in your hand, to complex graphic panels that regulate a complete manufacturing plant.

Instrumentation by Honeywell means a single responsibility for your complete control equipment . . . coordinated engineering, production and delivery. It gives you the important plus values of simplifying the training of your instrument maintenance men, and of minimizing your maintenance parts stock problems. And because this line is so complete, the instrumentation recommended for your application is selected without bias . . . needs no stretching or squeezing . . . represents the best combination of performance and economy for its intended job.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

• REFERENCE DATA: FOR A QUICK LOOK AT THE COMPLETE HONEYWELL LINE, WRITE FOR COMPOSITE CATALOG NO. 5001

MEETINGS CALENDAR

An extended list of coming meetings appears in the last issue of each month

MAY

NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS—47th Annual Convention, Conrad Hilton Hotel, Chicago, Ill., May 22-25.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Sixth Annual Appliance Technical Conference, Hollenden Hotel, Cleveland, May 23-24.

ATOMIC INDUSTRIAL FORUM—May Meeting, Waldorf-Astoria Hotel, New York, May 23-24.

PENNSYLVANIA ELECTRIC ASSOCIATION—Annual Accounting Conference, William Penn Hotel, Pittsburgh, May 23-24; Spring Meeting, Relay Committee, Abraham Lincoln Hotel, Reading, Pa., May 26-27.

AMERICAN MANAGEMENT ASSOCIATION—Hotel Roosevelt, New York, May 23-25.

EDISON ELECTRIC INSTITUTE—Sales Personnel and Training Committee, EEI Headquarters, New York, May 26-27.

NORTH CENTRAL ELECTRICAL ASSOCIATION—Accounting Committee, Fergus Falls, Minn., May 27-28.

JUNE

AMERICAN SOCIETY OF MECHANICAL ENGINEERS—Oil and Gas Power Conference, Statler Hotel, Washington, D. C., June 5-10; ASME-IME Comb. Conference, MIT, Boston, June 15-17; Applied Mechanics Conference, Rensselaer Hotel, Troy, New York, June 16-18; Diamond Jubilee Semi-Annual Meeting, Statler Hotel, Boston, June 19-23.

AMERICAN WELDING SOCIETY—Spring Meeting and Welding Show, Hotel Muehlebach, Kansas City, Mo., June 7-10.

***INTERNATIONAL ORGANIZATION FOR STANDARDIZATION** — General Assembly Meeting, Stockholm, Sweden, June 8-18.

ILLUMINATING ENGINEERING SOCIETY—Northwestern Regional Conference, Ft. Wm. Henry, Lake George, N. Y., June 10-11.

ELECTRIC COMPANIES ADVERTISING PROGRAM—Management Group, Statler Hotel, Los Angeles, Calif., June 12.

AMERICAN SOCIETY OF REFRIGERATING ENGINEERS—42nd Semi-Annual Meeting, Hotel Schroeder, Milwaukee, Wis., June 12-15.

EDISON ELECTRIC INSTITUTE—23rd Annual Convention, Los Angeles, Calif., June 13-16.

***COMMISSION INTERNATIONALE DE L'ECLAIRAGE** (International Commission on Illumination)—Zurich, Switzerland, June 13-23.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Magnetics Conference, Hotel William Penn, Pittsburgh, June 14-16; Summer General Meeting, New Ocean House, Swampscott, Mass., June 27-July 1.

AMERICAN SOCIETY FOR ENGINEERING EDUCATION—63rd Annual Meeting, Pennsylvania State University, State College, Pa., June 20-24.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Accounting and Business Practice Section, Vancouver Hotel, Vancouver, B. C., June 22-24.

WISCONSIN UTILITIES ASSOCIATION—Accounting Section, Dell View Hotel, Lake Delton, Wis., June 26-28.

MICHIGAN ELECTRIC ASSOCIATION—Annual Convention, Grand Hotel, Mackinac Island, Mich., June 26-29.

AMERICAN SOCIETY OF TESTING MATERIALS—1955 Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J., June 26-July 1.

***AMERICAN NUCLEAR SOCIETY**—1st Annual Meeting—Pennsylvania State University, State College, Pa., June 27-29.

CANADIAN ELECTRICAL ASSOCIATION—Annual Convention, Hotel Vancouver, Vancouver, B. C., June 27-29.

***INTERNATIONAL ELECTROTECHNICAL COMMISSION** — London, England, June 28-July 9.

JULY

***NATIONAL ASSOCIATION OF RAILROAD UTILITIES COMMISSIONERS**—Executive Committee Meeting, LaSalle Hotel, Chicago, Ill., July 8.

***NATIONAL HOUSEWARES AND HOME APPLIANCE MANUFACTURERS EXHIBITS**—Atlantic City, N. J., July 11-15.

* Additions this week.

POWER BRIEFS FROM THE NEWS

● Southern California Edison Co has offered to build a turbogenerator to be used with the sodium reactor experiment now underway at North American Aviation Co's plant near Los Angeles. The utility company consequently will put to use the heat generated in the experiment and may become first on West Coast to offer automatically generated power for sale.

● Illinois Power Co has started rebuilding its entire distribution system at Jacksonville, Ill. Project will convert the present 2,300-v primary system to a 4,160-v multi-grounded system.

● Contract for installation of a $30-million, 200,000-kw steam electric generating unit has been awarded Stone & Webster Engineering Corp by Niagara Mohawk Power Corp. The new unit, reported to be larger than any now operating in New York state, will be added to the utility's C. R. Huntley station near Tonawanda.

● Europe's largest hydroelectric plant, located on the Ume River in Sweden, has been scheduled for completion in 1959. It will contain three sets of generators with 130,000 kw capacity each.

● Agua Fria has been chosen as the name for Salt River Power District's new 100,000-kw steam generating plant to be constructed at a cost of $13 million northeast of Phoenix, Ariz. Plant construction, near the Agua Fria River, has been scheduled to start in August.

● Spokane has become the first city in the United States to require 200 ampere service entrance on all homes over 500 sq ft. Electrical code revisions, upgrading wiring requirement, were prompted because of increasingly high kwhr consumption by homeowners in Spokane and the surrounding area.

● Bill to authorize construction of a $10-million office building for the Atomic Energy Commission has been passed by the House and sent on to the President.

● Results of 13-nation survey on per capita use of electricity: Norway, with 6,500 kwhr per capita, ranks first; Canada, with 4,925, second; United States, with 3,244 third, and the Soviet Union, with 605, ranks 13th.

METER MAGNET CALIBRATOR on assembly line of new meter plant of Westinghouse Electric Corp at Raleigh, N. C., is pointed out by J. M. Wallace, meter division manager. In group are J. A. Babcock, left, plant manager; C. V. Morey, EEI Meter and Service Committee chairman; Wallace; and R. K. Swallow, AEIC Metering Service Committee head

Sutton Advises Utilities to Tell Story

Utilities must tell their story and continue to give high grade service. This was the advice of L. V. Sutton, president of Carolina Power & Light Co, to the joint meeting of the Edison Electric Institute and the Association of Edison Illuminating Companies Meter and Service Committees. The meeting was held, April 25-27, at Durham, N. C.

The former EEI president lampooned the claim that the Oak Ridge installation of the Atomic Energy Commission could not have contributed to winning the war without power from Tennessee Valley Authority. "But people are beginning to see through such propaganda," Sutton continued. "Utilities have a great story to tell; if they tell it, they can win."

Other speakers on the program covered many current metering problems including coordination with accounting procedures.

Spokesman for the accountants was R. G. Schneider, past chairman of EEI's Customers Activities Committee. A survey of this group, he said, disclosed 35 suggestions for joint consideration. Among them were these:

1. Leaving service connected when building is vacant.
2. Simplifying meter records.
3. Coordinating meter replacements with reading schedules.
4. Reading in 10-kwhr units.

Discussion disclosed sweeping acceptance of machine billing and expectation that new computers would accept five-figure readings. But more money can be saved by bi-monthly billing than by electronics, Schneider conceded.

Other items of interest from the meeting include:

Electric house heating at 1¢ per kwhr is causing monthly consumption of 3,500 to 5,000 kwhr in some Pacific Northwest homes. Spokane has decreed future entrance conduits and meter sockets must be good for 200 amp in houses 500 sq ft or over. Portland is considering similar action—L. M. Janz, Portland General Electric Co.

Field maintenance of demand attachments is creating new problems. Clutches slip on the mechanical types, and calibration changes on the thermal—F. A. Salmon, Central Power & Light Co. Discussion revealed that sun exposure contributes to clutch trouble. It was suggested that accuracy requirements of both types be kept reasonable to preserve economics.

Molded 600-v current transformers mounted on drip loops of service drops were reported trouble-free by several users. But installation of meter wiring involves questions of color-coding, mechanical protection, and checking for proper connection.

Bushing CT's offer substantial savings over conventionally wound CT's for high-voltage metering. But unless they are selected for the specific burden, they may not meet metering tolerance—J. A. Morris, American G&E Co.

Metering on the low side of customer-owned power transformers saves cost of metering transformers—G. F. Austin, Public Service Co of New Hampshire. Discussion revealed different methods of compensating for losses in the customer's transformers.

for the loads
of the future...

something NEW has been added

to the Sangamo J2–the meter of the future!

If you are adding to your customers' kwh consumption through load-building programs . . . through the promotion of adequate wiring . . . and if you are concerned about meter reading costs, you may be interested to know that *something new has been added to the Sangamo J2 Watthour Meter.*

The "something new" is an extra circle the same size as on 4-circle registers. This new 5-circle register practically guarantees *no register turn-over on big loads—even with extended reading periods.* And it's optional at no extra cost.

If you would like to see for yourself how efficiently designed this new register is, we'll gladly send you a standard production Sangamo 5-circle register. Just fill out the coupon below and mail it today.

the FIRST watthour meter with straight line accuracy up to 100 amperes!

SANGAMO
ELECTRIC COMPANY
SPRINGFIELD, ILLINOIS

JM55-4

SANGAMO ELECTRIC COMPANY • SPRINGFIELD, ILLINOIS
Please send me a new standard production Sangamo 5-circle register

NAME_____

COMPANY_____

TITLE_____

CITY_____ ZONE____ STATE_____

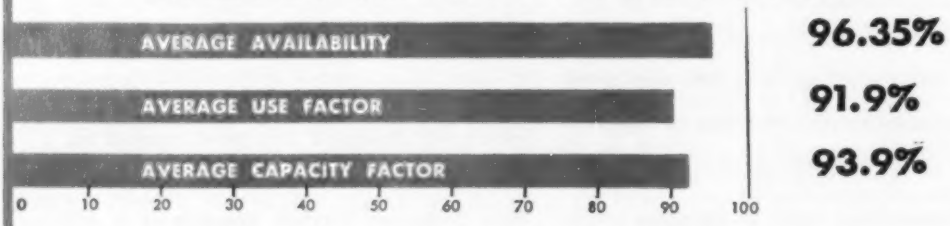
A look at the Record...

"ON THE LINE" PERFORMANCE of 76 C-E Reheat Boilers

There are 158 C-E Postwar Reheat Boilers in service, under construction or on order. These boilers represent an aggregate capacity of 18,473,000 kilowatts... an average of 117,000 kw per unit.

The first of these boilers was placed in service in September, 1949. By the end of 1954, seventy-six units were "on the line." The combined service of these 76 units represents a period equivalent to 129 boiler years. Significant data concerning them are summarized below.

Total Capacity — kw	7,670,000
Average Capacity per Unit — kw	101,000
Total Boiler Time — hours	1,130,040
Total Boiler Time — years	129



DISTRIBUTION OF TOTAL OUTAGE	PERCENT
Inspection	2.25%
Boiler • Superheater • Reheater Economizer • Air Heater • Desuperheater • Fuel Burning Equipment	0.83%
(Auxiliary Equipment) Valves • Fans • Soot Blowers • Miscellaneous	0.57%
TOTAL	3.65%

B-836

C-E

COMBUSTION ENGINEERING

Combustion Engineering Building, 200 Madison Avenue, New York 16, N. Y.

BOILERS, FUEL BURNING & RELATED EQUIPMENT; PULVERIZERS, AIR SEPARATORS & FLASH DRYING SYSTEMS; PRESSURE VESSELS; AUTOMATIC WATER HEATERS; SOIL PIPE

VAULTS measure 3 by 3 ft internally, average 3 ft deep, and have a half-round steel cover on the 42-in. square base

SEMI-BURIED TERMINAL BOXES have 16-in. square poured-concrete base enclosing secondary and service duct risers

Southern California Edison Co has Way to . . .

Cut Underground Distribution Costs

R. C. BLANKENBURG, Supervisor of Underground, Southern California Edison Co, Los Angeles, Calif.

Residential subdivisions in southern California are being served by an underground distribution system which can be installed for about half the cost of the usual underground system. The plan used by Southern California Edison Co is equally applicable to small tracts and larger developments.

Based on figures determined in a major installation serving 186 homes at Newport Beach, the gross electrical underground cost per service is $226. This cost is about three to five times that of equivalent overhead service, but 50 to 70% less than that of the conventional underground system. These figures differ only slightly from costs of installing the same system in a nine-home development in Santa Monica.

Customer Pays Extra Cost . . . In the Newport Beach development, as at Santa Monica, all installation costs above those for equivalent overhead service are borne ultimately by the home buyer. Decision to install underground distribution is made initially by the subdivider, and he bears the additional cost over equivalent overhead until the lot is sold. Before a system is installed, the additional unit and additional total costs of underground distribution for the entire tract must be agreed upon by the subdivider and the utility.

At Newport Beach lots are leased to the buyer-builder for a 52-year term. The ultimate buyer has a choice of several floor plans for a home in the $14-15,000 range. As the home buyer actually participates in the building of the residence, his concern with the appearance of the area around it whets his interest in underground installation of his electric and telephone services.

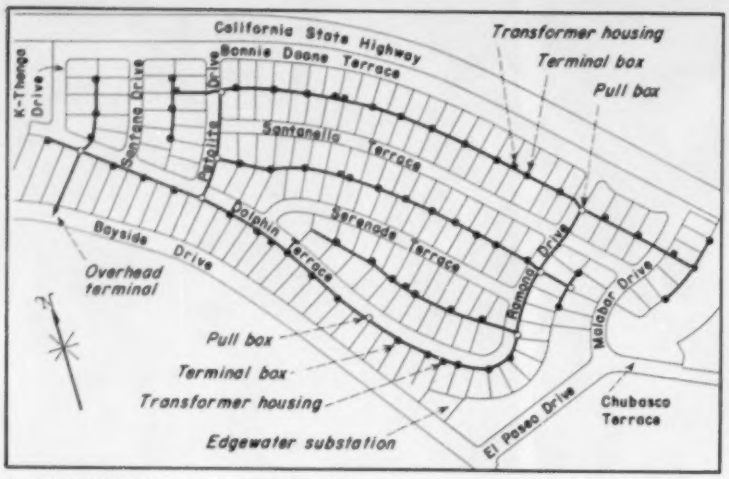
Expected load in these two developments is about 50 w per ft of rear property line. This includes both sides of the underground line and assumes about 1.5 kw of diversified demand per customer. To serve this type of load, Edison uses a 4.16-kv, wye primary and 3-wire, 120/240-v secondary.

Costs Shared . . . In analyzing cost of the underground system, it must be recognized that this is a joint installation with the telephone company. Costs were reduced by having the contractor install ducts for both systems at the same time in a common trench. Further savings resulted from installing facilities before other improvements except water and sewer lines were made. And these lines in the streets conflicted only slightly with installation of electric and telephone lines along rear property lines. Soil and terrain were ideal for machine trenching.

By agreement the owner/subdivider pays for all electric facilities except transformers. He is entitled to a refund based on an overhead free-footage allowance up to the total estimated cost of providing an overhead system in the tract. For telephone facilities, the owner-subdivider pays for structures only but gets no credit allowance for equivalent overhead service.

Duct Line Earth Covered . . . Primary circuits are 5-kv, lead-covered, No. 2 copper, 3-conductor cables for mains and No. 6 copper, single-conductor cable for tap lines. Weatherproof neutrals are No. 4 copper for the multiconductor cables and No. 6 copper for single-conductor. Minimum-size secondary circuits consist of two 2/0 copper conductors twisted with a No. 2 copper conductor. Higher-capacity circuits have two 250-MCM conductors and a 2/0 neutral.

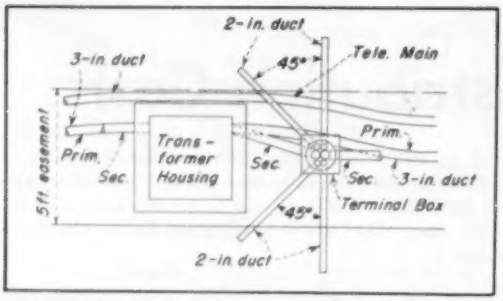
Rubber-like insulation on the conductors and a neoprene jacket overall provide dielectric and mechanical strength. The service cables to customer entrances are single-

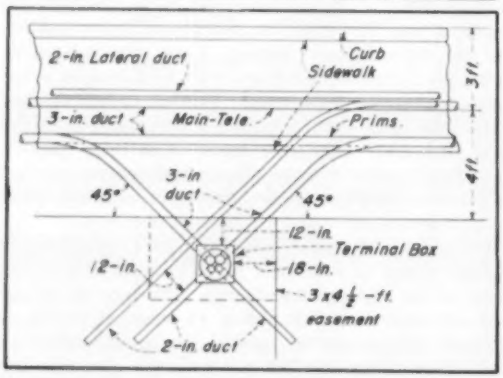


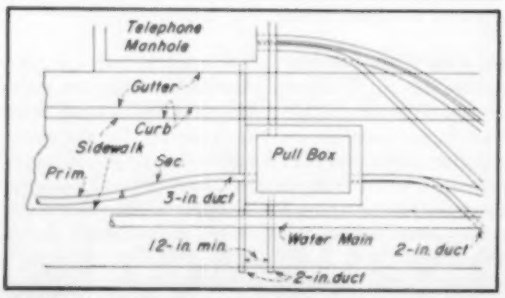
A 186-HOME TRACT at Newport Beach will be served by 4.15-kv, 120/240-v underground system. Primary and secondary duct lines will be installed by Edison

Here is underground system installed at Newport Beach on cooperative basis . . .

. . . Wherein customers and utilities share installation costs as itemized . . .







PLANS illustrate typical locations for the duct lines and transformer housing, terminal box, and pull box

conductor, No. 4 copper with rubber-like insulation. The three conductors are twisted and covered with a neoprene jacket.

All cables are installed in 3-in. dia inorganic-fiber duct lines, with secondary runs stacked above the primary lines. Banks consist of one run each of primary and secondary conductors. Minimum earth cover of 24 in. is maintained over all duct lines. A concrete envelope is used where lines run under a street. This envelope extends from one property line to another on both sides of the street.

In the initial installation 2-in. dia service duct lines generally are stubbed in to the property line. Extension of the service duct line is up to the house owner. After the duct has been completed, Edison crews pull in the cable. The property owner retains title to his part of the service duct line, along with responsibility for maintaining it.

Vault and Terminal Box Semi-Buried . . . Two developments contributing a major portion of the savings over a conventional full-underground system are the semi-buried transformer vault and secondary terminal box designed by Edison. Concrete blocks form the vault, these having a lower installed cost as compared with building forms and pouring concrete in the field. The masonry blends better with the brick work of the homes.

Vaults measure 3x3 ft internally and have an average depth of 3 ft. Although 15 and 25-kva, CP-type transformers are used initially, the vaults are large enough to accommodate the 50-kva size. Vaults are finished on top with a mortar water stop ¾ in. high. Loose blocks on the vault bottom raise the transformer to a convenient working position. As the ground has good drainage qualities, no drain tiles or large sumps are needed.

A 6-in. eye in the vault wall over each duct bank location aids in pulling in cable. Vaults are protected by a half-round steel cover, measuring 42-in. square on its base. Covers rotate on two hinge pins imbedded in the vault wall. An anchor pin locks the lifting handle of the cover to the vault. Each cover is ventilated by louvres at each end. Cost of this type of vault can be as low as 25% of that of a small, completely buried structure.

System Costs for Residential Underground (Newport Beach)

Unit Costs per Customer, Electric System only

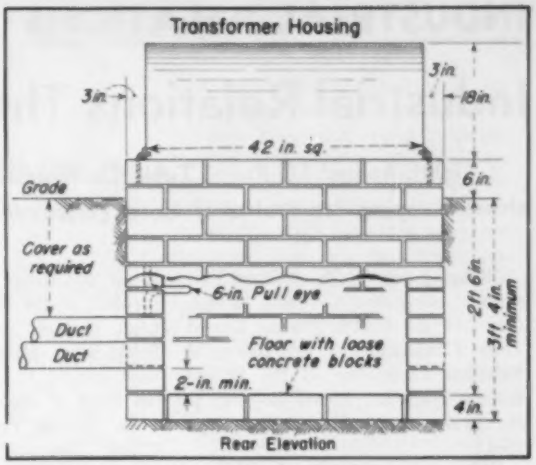
Service connection facilities and ducts	$ 36.80	
Main ducts, primary and secondary	31.40	
Electric share of common trench	22.50	
Transformer enclosure	13.30	
Structural subtotal		$104.00
Cable and miscellaneous	122.00	
Gross underground total		$226.00

Total Cost per Customer

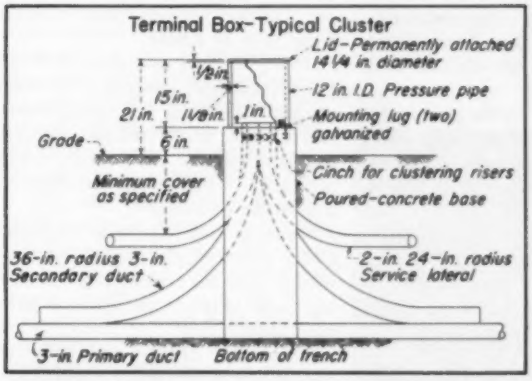
Telephone	$121.00	
Electric	226.00	
Total cost		$347.00
Maximum refund available, electric only	$ 53.00	
Net total cost		$294.00

Relative Costs, Electric only

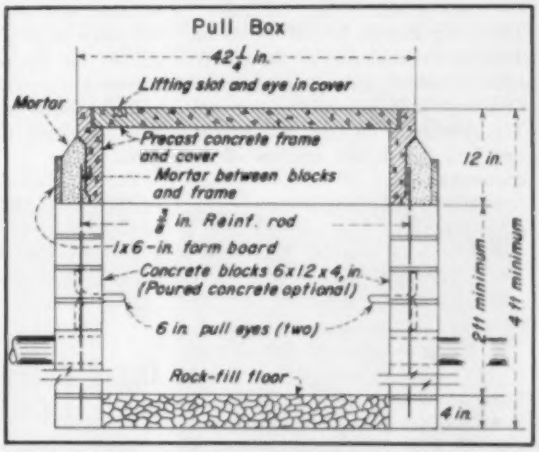
Equivalent overhead service	65- 80% less
Conventional underground	100-200% more



SEMI-BURIED TRANSFORMER VAULT houses 15 or 25-kva, CP-type transformers but is big enough for 50-kva size



TERMINAL BOX is over service and secondary ducts rising in poured-concrete pad. Two to four services run from boxes



PRECAST PANELS of reinforced concrete come in two types for forming parkway type pull boxes. Cover is concrete

Rear Property Line Chosen . . . In building the underground system into the subdivision, an attempt is made to locate both vaults and terminal boxes along the rear property line and at corners of the lots. Some vaults and boxes, however, must be placed at the front near the sidewalk. These may be hidden by shrubbery and flowers, and no serious complaints are expected. Each vault serves an average of five terminal or pull boxes, each of which serve a maximum of four customers.

Semi-buried terminal boxes have a 16-in. square poured-concrete base which encloses secondary and service duct risers. Risers are cinched in position with soft iron wire before the concrete is poured. The base is usually about 2 ft deep and rises about 6 in. above grade. Lid of the terminal box is an inorganic-fiber pressure pipe 12 in. in dia with a ½-in., 14-in. dia plate on the top. The lid bolts to two straps imbedded in the base.

Split-bolt connectors or indent-type links furnish connections between secondary and service cables. Taping completes the job. Installed cost of this terminal box is only about 25% of that of a fully-buried, field-built secondary handhole.

Pull Boxes Are Precast . . . Use of pull boxes is minimized. To reduce cost further, precast reinforced concrete panels form a box in the field. Normally only two sizes of panels are needed, one for sides and another for ends. A completed pull box measures 4x2½x3 ft. Earth walls below the precast panels are finished with concrete blocks. Good drainage eliminates sumps. Usually pull boxes are placed in the middle of the parkway between the sidewalk and the curb. They are protected by precast concrete covers.

Consideration is being given to a similar pull box to replace semi-buried terminal pads. The box has a more attractive appearance, and the increase in installation cost would be very slight.

Basic designs for this underground system were developed by the author with the assistance of R. L. Bryan, J. W. Lauder, and other members of the Edison underground department.

Industrial Relations Theme Set

Eighth Annual EEI Round Table Conference at Chicago will stress 'Reaping the Profits of Good Personnel Administration'

"Reaping the Profits of Good Personnel Administration" will be the theme of the Eighth Annual Round Table Conference of the Industrial Relations Committee of the Edison Electric Institute. It will be held at the Drake Hotel, Chicago, on Sept. 19-21.

"The industrial relations department, as any other staff department, must aid the line department to operate more profitably and efficiently." This is the thought behind the theme, Tom Ayers, chairman of the conference committee and vice president of Commonwealth Edison Co, declared. This approach, he said, will be carried into the various sessions of the conference.

The four topics and keynote speakers will be:

- "Living Profitably Under the Union Contract," Ks K. Allen, manager of industrial relations, Southern California Edison Co.
- "Using Manpower Effectively," C. Y. Osburn, assistant vice president, Long Island Lighting Co.
- "Making Communications Pay Off," De Witt Pike, superintendent of employee relations department, Rochester Gas & Electric Corp.
- "Making Personnel Administration Pay Off," Neely Henry, vice president, Alabama Power Co.

Types of Service

Under the fourth topic Henry will examine the many types of services provided by companies for their employees in the light of their contributions to the company's efficient and profitable operation. A challenging attitude toward these will be the speaker's position.

"Making Communications Pay Off" session will attempt to evaluate the sound, basic approaches to developing lines of two-way communication between management and employees through the utilization of such media as training programs, personnel conferences, house organs, etc.

"Using Manpower Effectively" group conference will approach the problem of the necessary steps to be taken to build and maintain an efficient work force and, at the same time, live up to the spirit, as well as the word, of union contracts.

In "Living Profitably Under the Union Contract" Allen will lay a background of the types of clauses necessary in a contract for a company to operate profitably and with a theory of management's dealing with the union at all levels. He finally will discuss the problems to be met by supervision in day-to-day encounters with the union and how their solution will contribute to an efficient work force.

For reservations to the round-table conference, contact E. S. Evans, secretary, industrial relations committee, Edison Electric Institute, 420 Lexington Ave, New York 17.

IBEW Rules Charges Against Gee Justified

George Gee, former Vancouver, B. C., business agent for the International Brotherhood of Electrical Workers-AFL, Local 213, who was expelled for alleged Communist activities, has received word his appeal for re-instatement to the union has been rejected by the international headquarters in Washington.

Gee was notified by J. Scott Milne, IBEW president, that Gee's appeal had been denied on the ground that original charges against him were justified.

Gee was expelled (along with 15 other union members) last month after union trial when John Raymond of Toronto, and a vice president of IBEW in Canada, found him guilty of 13 counts of Communist activity within the union.

Alfred Terry and Andy Johnston, IBEW officials from Washington and representing Milne, had made a secret investigation of the local. They said they had to deal with a "hard core of about 50 leftists who had been imposing their policies on the 2,400-member local."

Gee says he will now appeal to union's international executive council meeting in Washington in June and, if he fails there, will appeal to IBEW general convention in 1958.

Arizona Power District Ups Average Wages 3%

Salt River Power District, Phoenix, Ariz., has authorized an average 3% wage increase for about 1,000 workers.

Under a new contract with members of the International Brotherhood of Electrical Workers-AFL Local 266, the District granted raises ranging from 3¢ to 8¢ a hour.

This is the first time since 1949 the District has been covered by a union contract. In 1950 the union struck the District whose officials claimed the District as a municipality could not bargain with a union and obtained a no-strike injunction.

Recently the Arizona Supreme Court dissolved the injunction. Although there has been no contract during those years, labor relations have been good.

The Power District and its companion Salt River Water Users Association had a payroll of more than $5.5 million last year.

LABOR BRIEFS

J. Scott Milne, president, International Brotherhood of Electrical Workers, AFL, is making available a talk entitled, "Why . . . Don't Labor Unions Use Stock Ownership as a Means to Participate in Corporate Management?" For copy write, IBEW, 1200 Fifteenth St, N. W., Washington 5, D. C.

Michigan Senate Labor Committee and the constitutional amendments committee of the Missouri House of Representatives have rejected a "right-to-work" bill aimed at outlawing the union shop and other forms of compulsory unionism.

High-Frequency Lighting

Hailed as the forerunner of things to come, the first 400-cycle system to light a building goes into college fieldhouse

The first high-frequency fluorescent system to light a building's interior has been installed in the nearly-completed Union College Alumni Memorial Field House in Schenectady, N. Y.

Operating on 400-cycle power, the new system is being hailed as the forerunner of many large industrial, commercial and institutional installations.

Designed and developed by General Electric Co, the system consists of 490 eight-ft-long slimline fluorescent lamps. Frequency is increased to 400 from the standard 60 cycles by means of two 30-kw rotating-type package-unit frequency converters.

Its maker says the system cost approximately 10% less to install than an incandescent-mercury lighting system originally considered for the field house. In addition, it claims the 400-cycle system offers some 50% savings in annual operation and maintenance cost while producing 20% more light. Level of illumination over the field house's 44,000 sq ft of floor space is between 45 and 50 ft-c, said to be the highest for any field house.

Fixtures Weigh Less

High frequency operation made fluorescent lighting practicable for this installation, says G.E., because each fixture weighs 110 lb less than for a comparable 60-cycle system, and because wiring costs are lower. The slimlines produce levels of light from 20 to 50% higher than the same lamps operated on conventional 60-cycle power. The Union College lamps operate at 22% over their 60-cycle rating in watts.

Lighting fixtures are mounted at heights varying from 60 ft in the center to 34 ft on the sides. The largest ever used for high-bay lighting, they are eight-ft square and each contains 14 lamps. Each lamp produces 6,000 lumens, the entire lighting job about 3 million lumens. A simplified wiring system reduces the number of circuits from 84, for the incandescent-mercury lights originally considered, to 14 for the high frequency design.

Primary power source for the system is 208 v, three phase, 60 cycles. The secondary is 600 v, three phase, 400 cycles, connected to be 300 v to ground. Since 400 cycles as well as starting voltage is distributed, it is possible to use a simple series capacitor and series choke for ballast on alternate lamps. The split-phase circuit produces unity power factor to obtain max utilization of the converters.

G.E. has carried on studies of high-frequency lighting at its Nela Park laboratories in Cleveland, Ohio for several years. In addition to rotary, or motor-generator convertors, investigations in the operation of fluorescent lamps at frequencies higher than 60 have been made with the use of electronic (thyratron) converters and static (magnetic frequency multiplier) converters. The rotary, at present, is lowest in cost of the three.

BTU or HP and Tons?

BTU ratings will replace tons and hp in advertising ratings of air conditioners if the Air Conditioning and Refrigeration Institute and the Association of Better Business Bureaus, Inc have their way. The two groups have proposed the change, saying that presently-used ton and hp ratings do not give the customer a true picture of an air conditioner's cooling ability.

Moving up conveyor to dryer . . .

where blower heats 'em . . .

Walnuts Are Dried Electrically

An automatic electric dryer speeds drying and reduces handling of walnuts on the A. E. Heltwood ranch, Sacramento, Calif. The dryer can process about a half ton of nuts in 24 hr.

Nuts from a hulling machine are picked up by a conveyor belt, powered by a ½-hp motor, and carried to the top of the dryer. The dryer consists of two bins stacked one above the other and through which heated air is blown by a ½-hp blower. Nuts are pre-dried in the upper bin and cured in the lower.

Heating units are 12 cone-type 1-kw resistance haters in a plenum chamber. They are connected to a weighted cut-off switch that is activated whenever the blower stops. Consumption is 625 kw per ton of nuts dried. Installation is served by the Sacramento Municipal Utility District.

(*More Sales and Service on page* 55)

Super power transformers pace utility expansion

Highest rated transformer ever installed in U.S.

THIS is a 230,000-kva, three-phase power transformer, one of eight of this rating built by Allis-Chalmers to step up voltage for transmission from a steam generating station. Seven of the eight units have been shipped; the eighth will be shipped this year.

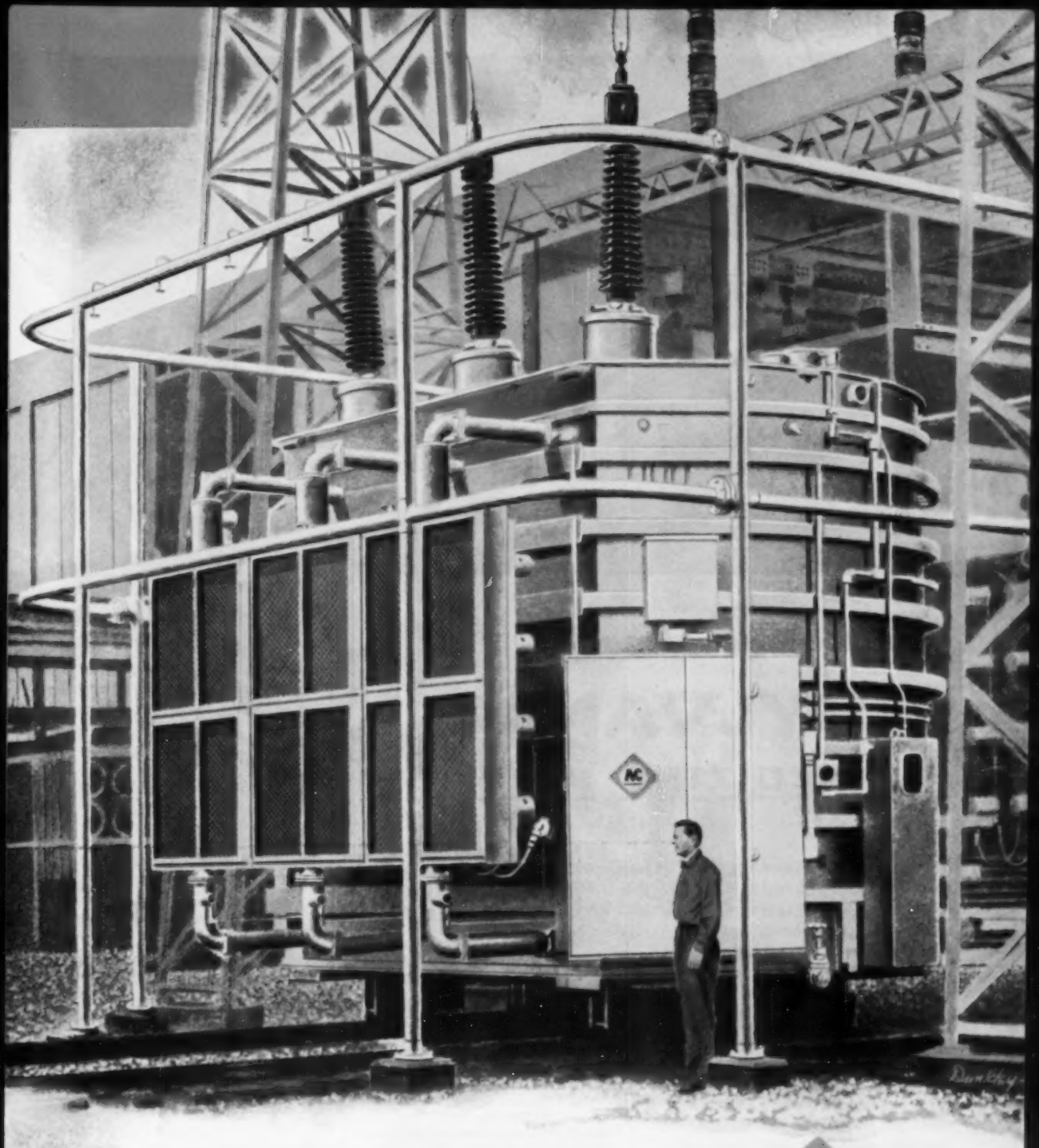
This enormous power transformer is an example of the record-breaking, trend-setting units built by Allis-Chalmers for power systems all over the country. Here are some of the features worth noting:

- Like all Allis-Chalmers power transformers, it is corona-free. Regardless of its tremendous size and great number of parts, the creeping deterioration of corona can never shorten this transformer's useful operating life.
- New aluminum welding techniques developed by Allis-Chalmers make this unit 15,000 pounds lighter than standard designs. Structural members are the same strength as before, but weigh far less, so that shipment and installation are easier.
- This transformer tested well below requirements specified for noise. One reason: the extra-quiet cooling system, using Allis-Chalmers developed *Electro-Coolers*. By increasing the number of fans and reducing the individual diameters of each fan, Allis-Chalmers engineers were able to reduce this source of noise significantly without impairing efficiency. Continuous noise research at Allis-Chalmers includes tests of completed transformers at a 10-acre outdoor proving ground where exact field conditions can be duplicated.

An Allis-Chalmers representative will be glad to discuss these and other transformer developments with you at your convenience. Call the nearby A-C office or write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4715

NEW ERA
IN POWER
TRANSMISSION

ALLIS-



CHALMERS

A-C
ALLIS-CHALMERS

General Machinery Division

Outdoors, indoors, mercury-vapor lamps are subject to the effects of vibration.

Here's where new

SYLVANIA

RUGGEDIZING PAYS OFF

Now Sylvania engineering adds another important extra to the long-service characteristics of mercury-vapor lighting—rugged, vibration-resistant construction—for extra dependability under severe working conditions.

In new ruggedized Sylvania mercury lamp design—Sylvania engineers have cast aside the old-fashioned method of tab-mounting resistors. "Too vulnerable to vibration," they said. Straight-through mounting and *wrapped welds* now give resistors in Sylvania mercury lamps the ruggedness that means extra service: greater economy.

Make it a point to order Sylvania mercury-vapor lamps—and see for yourself how ruggedizing pays off. For details, contact your Sylvania supplier today.

SYLVANIA ELECTRIC PRODUCTS INC.
Lighting Division, Salem, Mass.
In Canada:
Sylvania Electric (Canada) Ltd.
University Tower Building, Montreal

STRAIGHT-THROUGH RESISTOR MOUNT

in Sylvania mercury-vapor lamps now adds new stability where vibration used to be a primary trouble source.

SYLVANIA®

...fastest growing name in sight

LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY

Housewares Boom

They now rank second to refrigerator in sales, second to water heaters in kwh usage

Electric housewares rank second only to electric water heaters in approximate kwh consumption among leading appliances sold in 1954 reports a "Facts and Figures" handbook now being released to utility executives.

Published by the Electric Housewares Section, National Electrical Manufacturers Association, the handbook reports further that:

- Electric housewares (including household-type fans) have risen 96.7% since 1949 and now stand close to $1 billion in annual sales.
- They now rank second only to refrigerators in annual retail sales value when compared with leading major appliances.

Booklet's purpose is to stimulate utility interest in Nema section's 1955 Electric Housewares Campaign. Through this program, which will tie-in with Edison Electric Institute's two coordinated housewares promotions planned for this year, the section hopes to "create maximum excitement at the customer level." Campaigns will concentrate particularly on the current Mothers Day-June Bride gift-giving season and Christmas.

Display Contest . . . To spur utility participation, the section is at present sponsoring its annual electric housewares window display contest. A plaque will be presented to the company having the best window display to tie in with the 1955 campaign theme, "Electric Housewares for Modern Living—and for Modern Giving." Here are the contest rules:

1. Send photo of window display to Display Contest Editor, Nema, 155 East 44th St., New York 17, N. Y.
2. Attach letterhead with name and address of store, person making entry, and of distributor who assisted.
3. Entries must be postmarked no later than July 5, 1955. No entries will be returned.

Another contest is underway for electrical leagues, in which they submit a complete year's presentation of their housewares promotional activities. Deadline for entires is July 5, and should be directed to the Electrical Leagues' Contest Editor at the above address.

Tepee TV

Chief White Eagle installs a television antenna atop his Indian wigwam in the Iroquois village of Caughnawaga, on the outskirts of Montreal, Que. Chief Eagle is believed to be the first Indian in North America to place a TV aerial on a wigwam.

Toll TV or Not?

Zenith Radio Corp is intensifying its efforts to get subscription television into American homes. H. C. Bonfig, vice president of the firm told a Chicago audience recently that subscription TV regularly would bring hit Broadway productions to the viewer at a fraction of what they would cost at the box office. Earlier, Federal Communications Commission announced it would institute a rule-making proceeding to consider its approval. At the same time a representative of motion picture exhibitors, Public Relations Man Harold Wolff said toll TV would set the stage for a giant grab of the public domain. "It could tie Hollywood, Broadway, sports and television together in a giant monopoly."

Meanwhile, the Chicago City Council has passed a resolution urging the adoption of the subscription plan.

S & S SHORTS

More Street Fluorescents:

Cleveland may get 128 fluorescent street lamps on Euclid Ave. near its famous Public Square if legislation introduced to its city council goes through. Job would cost $60,000, and city officials are working to get it into the works and finished in time for National Institute of Street Lighting meeting there next fall. Regulators at top of each 30-ft pole will permit fluorescent tubes to be extended horizontally or at upward angle over street.

Waterless Conditioner Ready

A waterless packaged air conditioner for commercial use that can be suspended from the ceiling or mounted on a shelf is being put into limited production by General Electric Co. Said to be the first completely packaged air-cooled unit in the industry, it is available in 3, 5, and 7½ ton capacities. Water-cooled models, with the same space-saving features, also will be marketed.

Small Washer for Big Market

A 25-in. family-size automatic washer which handles eight pounds of clothes is being marketed by Westinghouse Electric Corp. Idea is to aim at small homes and apartments plus larger homes after Westinghouse study showed 49% of automatic washer owners put unit upstairs even though 57% of them have basements.

More Selling Coordination

Edison Electric Institute's Coordinated Appliance Campaigns to give more concentrated smash to industry promotions is getting some extra support from manufacturers. Hotpoint Co, for example, is pushing the preseason appliance selling idea in a special program, wrapped in a single package, which it is distributing to utilities, distributors and retail outlets throughout the country.

Room Coolers Catalogued:

Specifications of 1955 window air conditioners are compiled in special section of "Refrigerating Engineering" magazine's April 1955 issue. Reprints are available from magazine at 234 Fifth Ave, New York 1. Prices range from 4¢ to 25¢ depending on quantity ordered.

Westinghouse Uses IBM Computer

Complex designs of large power transformers are being produced in a matter of minutes instead of hours and weeks, announced Bruce D. Henderson, Westinghouse vice president. This is accomplished through the use of International Business Machine 701 computers. Henderson added that they have successfully programmed the design of power transformers in ratings from 500 to 10,000 kva. Company engineers claim that the series of designs made by the machine, when verified with existing ones, are better balanced.

Input data to the machine includes such values as impedance and limiting values of iron loss, total loss, exciting current, sound level and temperature rise. The computer then automatically designs the transformer, making necessary adjustments of physical quantities and proportions of iron, copper and insulation to converge the design within acceptable limits of guarantees. During design of the core and coils, it calculates surge strength and designs to withstand standard impulses. It also calculates the amount of cooling required as well as the number of cooling fans if the unit has a forced-air rating.

Westinghouse plans to install a new IBM-705 computer at Sharon, Pa. in 1956, according to Henderson.

Brown Boveri Breaker Operates in 2-Cycles

Brown Boveri Corp of New York has a line of ultra-high speed air-blast breakers in outdoor housings for distribution service. W. R. Streuli, vice president, advises that the speed of interruption from moment of energizing trip coils to fault interruption is not over two cycles for the full range of current from zero to full interrupting rating. He said that the mechanical speed of these breakers is about one cycle.

The breakers are designed for 4.1, 7.2, 13.8 or 14.4 kv, for currents up to 1,200 amp and interrupting ratings of 150, 250 and 500 mva.

An oscillogram has shown that an interruption of 7,000 amp at 5 kv [obtained on a 7.2-kv, 150-Mva unit with the aid of a fast relay] was cleared in two cycles arc duration, including relay time.

Sylvania Ties 51 Cities To N. Y. Data Center

Sylvania Electric Products Inc and Western Union Telegraph Co have announced plans for a nationwide 12,000-mile private electronic communication system linking 51 cities with Sylvania's Data Processing Center (EW, Feb. 14, 1955, p 51) at Camillus, N. Y.

Leon C. Guest, Jr., Sylvania controller, said the company has contracted with Western Union to provide the specialized communications facilities to link the company's laboratories, sales offices, warehouses, divisional headquarters and executive offices. These installations will feed financial and production information to the Center via the leased network. Sylvania's private wire system will be the first nationwide network designed for automatic transmission of control data, said Walter P. Marshall, president of Western Union.

Aluminum Production

Primary aluminum production, according to the Aluminum Association, was 130,274 tons in March, up about 14,000 tons from 116,236 tons in February, and an increase of about 8,000 tons from 122,339 tons in March 1954. Production was 374,212 tons for the first three months this year; up 25,000 tons from 349,068 tons for the same period in 1954.

A-C Expands Transformer, Circuit Breaker Plants

Plans for a multi-million dollar transformer and circuit breaker manufacturing expansion program at Allis-Chalmers Manufacturing Co's Terre Haute, Ind. and Gadsden, Ala., plants have been announced by J. W. McMullen, vice president.

Large high-voltage power transformers and high-voltage heavy-current circuit breakers will be manufactured at the Terre Haute Works, and distribution transformers at the Gadsden Works, he said.

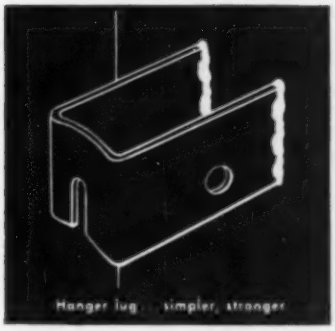
McMullen said that plans were now being made for the erection of a new 114,000-sq ft building at Terre Haute. He estimated the new plant, tooling and landscaping would cost approximately $9.5 million. Plant is expected to be in operation in 18 months.

The Terre Haute Works now assembles switchgear, fabricates transformer tanks, and is manufacturing compressors for the J-65 Curtiss-Wright turbo jet engine.

The Gadsden plant will begin manufacturing distribution transformers late this year.

Jim Donald, Distribution Transformer Product Engineer, calls your attention to this

FACT: New hanger lug construction eliminates corrosion, increases strength 39%



The new hanger lug construction on Westinghouse pole-type distribution transformers is simplicity itself, and 39% stronger than ever before. Still meeting EEI-NEMA Standards, lugs have straight sides which are scalloped and flash-projection-welded directly to the tank wall. This results in a continuous weld so that crevices and moisture traps are eliminated.

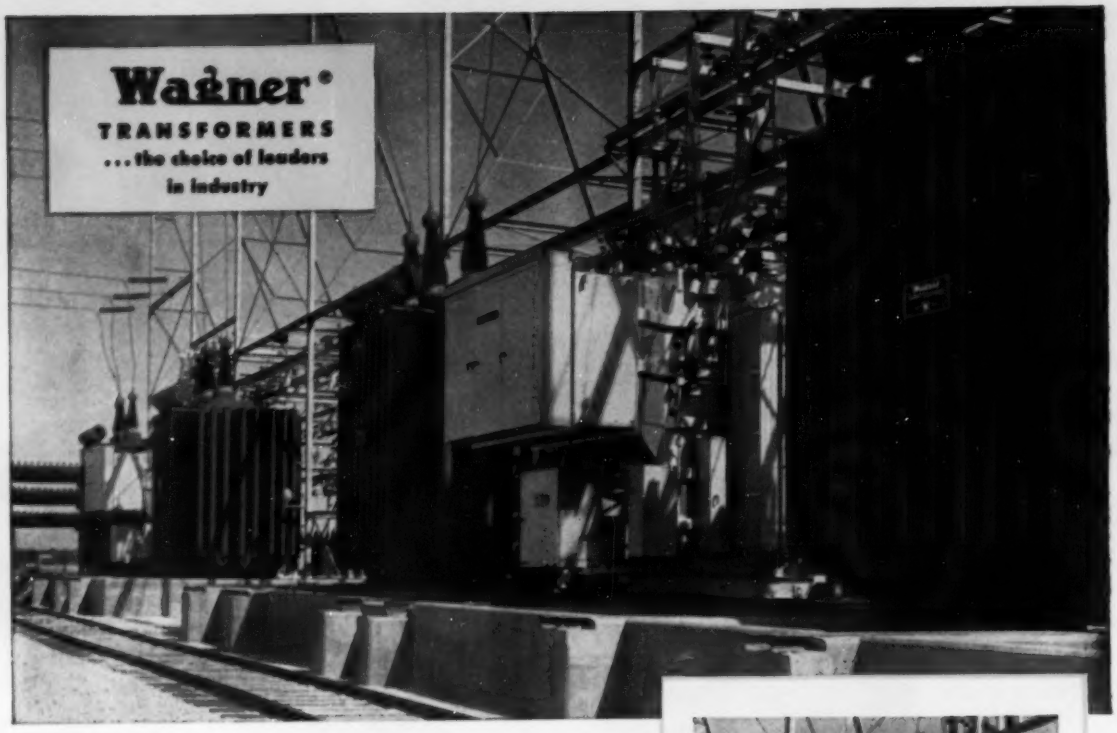
Yes, there is dollar protection in *every* design detail of these all-new Westinghouse transformers.

• • •

Get the facts from The Man With The Facts . . . your Westinghouse Sales Engineer. Or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70741

YOU CAN BE **SURE**... IF IT'S

Westinghouse



to produce an aluminum pig

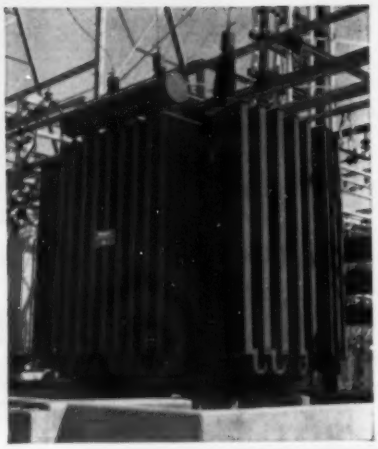
Aluminum, most abundant of all metallic elements on earth, would be one of our rarest metals were it not for the magic of electricity. The production of aluminum is a highly complex electrolytic process.

A major step in this process—the transformation of bauxite into 50 pound aluminum pigs—takes place in huge smelting plants, like the Rockdale, Texas plant of the Aluminum Company of America.

At Rockdale, Wagner transformers play an essential role in this process. This bank of four Wagner Power Transformers was recently installed in the main substation at this plant. Each is rated 25,000/33,333/41,667 kva, 138,000 to 13,800 volts.

Such banks of Wagner Power Transformers can be found at many great industrial plants . . . because they handle their never-ending job of supplying proper voltages for every purpose with great efficiency and dependability.

Let a skilled Wagner engineer discuss your transformer needs with you. Call the nearest of our 32 branch offices, or write us direct.



Here is one of the four Wagner Power Transformers that form the main substation shown above. Each is rated 25,000/33,333/41,667 kva.

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6456 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS—AIR AND HYDRAULIC

WT53-1

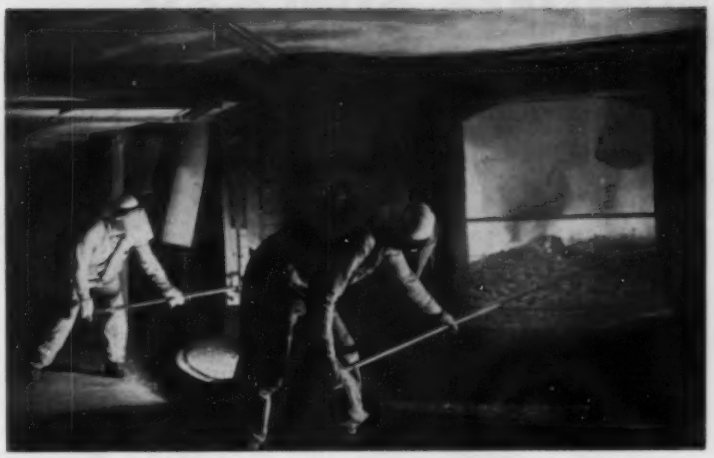
Fairbanks, Morse & Co In New Eastern Headquarters

Fairbanks, Morse & Co has formally opened its new eastern regional headquarters at 19-01 Route 208, Fair Lawn, N. J. This sales and service headquarters and warehouse will serve a seven-state area including Connecticut to Virginia. The company's Export Division sales offices also are located in the 50,000 sq ft building.

Executives at the headquarters are: In the Domestic Branch—F. C. Johnson, manager; C. N. Malone, assistant manager; in the Export Division—C. W. Linschied, manager; C. W. Batkey, assistant to the manager.

Harper Co Completes Metals Division

The H. M. Harper Co of Morton Grove, Ill., a manufacturer of fastenings, has completed construction of a metals division at a cost of over $2 million. Included in the installation are melting furnaces, extrusion press and wire drawing equipment. According to the company, it now is able to produce all types of fastenings in corrosion-resistant metals, from the raw metal to the finished product.



Silicon Smelting Furnace "Poured-Off"

The 6,000-kva smelting furnace at Dow Corning Corp of Midland, Mich., "poured off" its first "tap" of 98% pure metallic silicon recently. Dr. W. R. Collings, president of Dow Corning, called this accomplishment "another important step in the integrated manufacture of silicone products."

Each "tapping" of the furnace yields about 1.5 tons of pure silicon; the tap lasts about 45 min. Upon cooling, the brittle and crystaline material is ground to powder for the manufacture of silicones.

In the furnace reaction, quartzite rock is reduced with coke and charcoal. The furnace maintains 3,100 F which is the temperature necessary for the reduction of silicon. Heat is furnished by an arc from three water-cooled carbon electrodes, each 2.5 ft dia, 27 ft long, automatically adjusted and energized by 35,000 amp at 100 v from a 3-phase circuit. About 3,000 lb of molten silicon are drawn off every 3 hr.

MANUFACTURING BRIEFS

General Electric Items

• Largest steam turbine-generator to be installed in New York State will be built for Niagara Mohawk Power Corp by General Electric Co. The 200,000-kw unit will be installed in the Charles R. Huntley Steam Station and is scheduled to be in operation in 1957. It will replace three 20,000-kw GE-built units installed in 1916-1917. The unit will be the cross-compound, single-flow, close coupled, reheat design. This is reported to be the first single-flow unit of this design in the country.

• Two 16,000-kw combustion gas turbine-generator sets are scheduled for shipment to Planta Electrica of Groupo Industrial in Monterrey, Mexico, in 1956. The sets are reported to have a higher rating than any yet manufactured in the Western Hemisphere. The simple-cycle, single-shaft sets will be installed adjacent to the Hojalata y Lamina steel mill. Natural gas will be used as fuel. It is expected that eventually the heat in the exhaust gas of the turbine will be used to generate process steam in heat recovery boilers.

Hendrix Wire & Cable Corp of Boston has developed a 5-kv molded-resin aerial cable clamp for use on secondary distribution circuits. This Tri-3 Hendri-clamp spaces the single- and 3-phase conductors equilaterally on 3-in. centers.

Westinghouse Items

• A plant expansion and renovation program has been started at the Fairmont, W. Va., glass works of the Westinghouse lamp division, according to F. M. Sloan, general manager of the division. The program is expected to cost upwards of $250,000 and is scheduled for completion by mid-summer, 1955.

• Schneider Mfg Corp of Muncie, Ind., a wholly-owned subsidiary of Westinghouse since Oct. 1954, is being dissolved to form the hydraulic drives department of the company's gearing division. The new department will sell, engineer, and manufacture industrial hydraulic torque converters and associated brakes and transmissions. Headquarters will remain at Muncie.

Robertshaw-Fulton Controls Co has re-named the American Thermometer Division of St. Louis, Mo., as the American Controls Division.

Sylvania Electric Products Inc recently completed a district headquarters—a 52,000-sq ft warehouse and service area and 6,000-sq ft sales office at 4700 Parkside Ave, Philadelphia, Pa. The building is on a 5-acre site, is completely air conditioned and has fluorescent lighting throughout.

BUSINESS OUTLOOK

Electrical World
MAY 23, 1955

The outlook, in brief: In a word, it's good for the balance of the year. Chances are that business gains won't be as great over the next few months as they have been recently. Industrial production will slip in the summer, because of slowdown in autos. Tighter money may slow the housing boom. But appliance sales are likely to go great guns all year, and business will be spending more for new plants and equipment. Business as a whole will be high—but no longer shooting up every month.

—•—

Industrial production is back to record levels—136-137 on the Federal Reserve Board index. And it's likely to stay in this neighborhood at least through June. This is the highest level of civilian production in history. The previous record for the FRB index, 137 in two 1953 months, included a much larger proportion of military production than we have today.

After June, the index may slide slightly for a couple of months. The reason: the sharp drop expected in auto production. After making more than 4 million cars in the first half (assuming no serious strike), the auto people will have to give the public time to buy them up before putting out new models.

But drop in the national FRB won't mean much loss of sales to most power companies. Other industries will hold up much better than autos. Even steel and other industries that usually cut output when autos drop off are expected to produce at high levels this summer. The reasons: heavy demand for steel and other materials from other industries—and probably some inventory building for a new burst of production in the fall.

FRB may be around 132-133 for the third quarter, then rise in the fall. The autumn rise will probably be slow, though—not like the spectacular jump of the past half year.

—•—

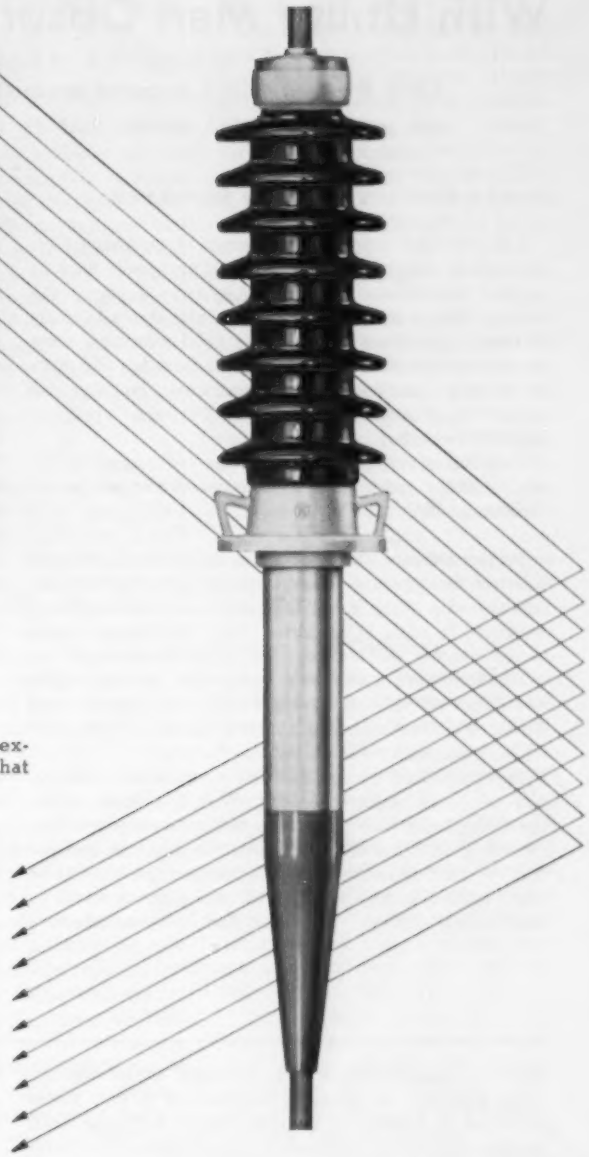
Appliance production is running strong now—and probably will all year long. There will be the usual bumps. But high output is being supported by very high sales.

Appliance sales may run 20% higher this year than last, with some of the growth products (semi-luxuries like dishwashers) doing especially well. Consumers have the money—$8-$10 billion more after taxes than one year ago—and they are extraordinarily willing to part with it. They are also extremely willing to spend other peoples' money, in the form of credit.

Borrowing money—for business or personal use—may continue to get tougher. Neither Washington nor the people who lend money want inflation. And they don't want the boom to get too exuberant, either. There's enough concern about these possibilities, in both official and unofficial circles, to make money tighter than it is now.

Tighter money may mean slightly higher yields for utility bonds. But probably not much higher. Official tinkering with money rates will remain cautious. Washington may be afraid of a boom—but it's a lot more afraid of knocking the boom in the head.

O-B offers a new ASA standard bushing with many advantages to the user



New O-B Class LK bushings now meet or exceed all provisions of the ASA Standard. What does this standard mean to the user?

- By proper application of the standard, a substantial saving can be effected in replacement inventories.
- Even with these greatly-reduced inventories, any emergency need can be met.
- All bushings now have a high degree of interchangeability.
- From 23 to 69 kv, inclusive, many hundred different types have been reduced to only 24 under the ASA Standard. This embraces both transformers and circuit breakers.
- The above simplification permits manufacturing economies, quicker deliveries, and factory stocking, as a result of repetitive production heretofore impractical.

These are just a few highlights of the ASA Standard, promoted and adopted by operating groups of the electrical industry.

O-B's interpretation of this standard is a pencil-slim bushing of highly advanced design. For this manufacture we have installed completely new facilities, including new buildings, machinery, and test equipment. Behind this development is O-B's reputation of 40-years' standing in the bushing field for successful performance and a high degree of technical competence.

Ohio Brass

MANSFIELD OHIO, U.S.A.

4524-H

With Utility Men Observing Operation Cue

EW's Western Editor recounts experiences of the industry contingent who sat out long-delayed atomic test to determine effect on power facilities

FRANK J. KOVALCIK, Western Editor, Electrical World

LAS VEGAS, NEV.—An observer at Operation Cue, the nuclear test to determine effect of an atomic blast on civilian facilities including power systems, reported this mode of life for the 11-day waiting period: Start all activity at noon. Quit about 6 AM for a good morning's sleep. Provide weather that changes suddenly from hot and dusty to freezing and dusty. Have conflicting bulletins and rumors reported from time to time. For those who care, jingle silver dollars intermittently.

This comes very close to what was experienced by the electric utility engineers and others who took part in the experiment at Yucca Flat.

Project Officers Check . . . The utility contingent consisted of three groups. There were the project officer and deputies who stuck it out for over two weeks at Camp Mercury, 70 miles in the desert from Las Vegas, waiting to see whether the nuclear blast could knock down the installations built under their supervision. Project officer was Ralph Wood, Philadelphia Electric Co; deputies were Arthur Werden, Southern California Edison Co, and Russel Berg and Richard Hart, Bechtel Corp.

By comparison the official utility consultants and observers had an easier time of it. With Las Vegas as the operating base, they made the 200-mile early morning round-trip to Yucca Flat each time the shot was declared "on" by AEC after the 10:30 PM weather briefing. These trips required getting up at 1 AM and donning layers of cold-weather clothing. After breakfast at Camp Mercury at 3 AM, the group was briefed by project officers and then rode 30 miles to the usually cold, windy and dusty observation post.

Among the consultants were Max Ulrich, Edison Electric Institute; William Meese, Detroit Edison Co; M. E. Paddleford, Commonwealth Edison Co; and John Kiely and Karl Bausch, Bechtel. Observers included Harold Quinton, president of EEI and Southern California Edison; Paul Metcalf, Narragansett Electric Co; Gene Huff, Union Electric Co of Missouri, and C. C. Whelchel, Pacific Gas & Electric Co.

Special Clothing Used . . . When the shot was called off—three times after 3 AM—the engineers made another final inspection of the installation before returning to bed in Las Vegas by 7 AM at the earliest.

On D-day the project officer and deputies inspected the equipment within a few hours after the blast (see page 16). The radiation-safe clothing they wore might have been designed to seal them off completely from the outside world. It was not recommended apparel for mid-morning on the Nevada desert.

They also supervised the thorough testing of all lines, equipment, and structures before and after the nuclear blast. A final report for EEI will be prepared and given to the Federal Civil Defense Administration for transmittal to AEC to undergo de-classification. By the time this report is released, the wearisome aspects of Operation Cue doubtlessly will be overshadowed by the humorous and sometimes pleasant incidents. But for all who took part, the release may come as an anti-climatical reminder.

TECHNICAL NOTES

Inductive commutators provide necessary connections between resistance temperature elements on turbine rotors in service to 1,500F and the indicating instruments. Each temperature element connects a pair of coils on the rotor, one of which picks up radio frequency excitation from one set of stationary coils. The other rotor coil induces the signal in a second stationary set of coils to actuate the indicator.

New fluorescent lamp incorporates a tungsten ballast to start and stabilize the glow discharge. It incidentally adds incandescent qualities to the fluorescent light.

Perfect linearity in a communication circuit eliminates difficulty in separating channels at the receiving end. Nonlinearity causes cross-talk in communication, color errors in TV.

Matrix algebra simplifies tedious computations of mutual couplings to permit use of symmetrical components for unbalanced electrical systems.

Neutral terminal failure on the secondary of one distribution transformer sparked 14 lawsuits for damage to customers' appliances from abnormal voltage.

Capacitors like cool air but usually land in the hottest secondary vaults. Fans cool these capacitors as they do people.

Preheater sizes large enough to require recirculation or steam-air heating under full-load conditions may be advantageous because hot-air recirculation and steam-air heating permit lower exit-gas temperatures than are possible otherwise.

Vepco's Rate Hike Upheld

State Supreme Court has dismissed an appeal by Arlington County against State Commission allowing company an increase

An appeal by Arlington County against a decision of the State Corporation Commission, in granting a rate increase to the Virginia Electric & Power Co, was dismissed on April 25 in an opinion by Justice C. V. Spratley of the State Supreme Court.

The opinion of the court said: "Briefly and concisely stated, the assignments of error are predicated upon the charge that evidence before the commission as to rate base, revenues, expenses, rate of return and the relationship of particular rates did not justify the action of the commission."

The additional earnings sought by the company amounted to $4.8 million for the system as a whole, of which $4,284,000 would be applicable to the Virginia jurisdiction. The return on the system rate base was calculated as 5.87%.

Rate Base

The commission rejected the company's new evidence of reproduction cost despite the company's objection. SCC used instead net original cost rate base but included unamortized portion of Account 100.5 and an allowance for working capital. An end of the year rate base was also allowed.

With regard to Account 100.5, the commission noted that such amounts were created in arms-length transactions and, hence, constituted prudent investment to the purchaser. Furthermore, as to the allowance for cash working capital, the commission was of the opinion it ". . . could not be offset by accrued and deferred federal income taxes and customers' deposits because such funds were not all available to the company for working capital purposes."

It is of interest to note that one of the commissioners ". . . was of the opinion that there was no necessity to fix a rate base in this case under the orthodox formula, and he disagreed with the conclusion of the majority as to the amount of the additional gross receipts needed by the company . . . He said that in order to ascertain the proper amount of increase, it was only necessary to find out how much was required to enable the company 'to pay its expenses and make a profit sufficient to attract new capital.' Employing the latter method, he arrived at a rate increase allowing additional gross receipts amounting to $3,853,000 as sufficient to accomplish the purpose desired."

This method of regulation has had wide acceptance both in Canada and in England before the war.

Rate of Return

Company testimony on the rate of return, presented by an independent investment expert, found that 6.25% and 6.30% was needed to attract capital. As previously noted, the system-wide increase produced a rate of 5.87%. The opinion noted that "the objectors to the increase presented no substantial evidence as to a proper rate of return. As Commissioner Lester Hooker said: 'A fair rate of return can never be established by a rule of thumb. It requires in our opinion, a consideration of all evidence of record and a conclusion based on the evidence and on judgment and experience.'"

The opinion noted that the commission allowed the amortization of plant acquisition adjustments as operating expenses over the county's contention that this adjustment was improper. The opinion stated, "The commission included, as a proper charge, this expense just as it allowed the net amount in the property acquisition adjustment account to be included in the rate base and for the same reasons."

The court continued, "It was also claimed that charitable donations should not have been deducted before determining net income. As Commissioner Hooker said, it can not be overlooked that utilities are expected to make reasonable charitable donations, because a refusal might bring on the loss of the good will of the community it serves, while other businesses make donations for worthy causes."

The court rejected the county's contention that rates in the Alexandria-Arlington area should be lower than in other parts of the system because of greater customer density. The opinion noted, "The statewide rule adopted for telephone rate-making may be more logically applied to an electric utility. A telephone utility at least has a unit for division, an exchange. No such unit exists for the electric business.

"There are many gradations of telephone service conditions; but the service of electricity is the same at all places and its value cannot be distinguished. Of course, the cost of rendering service in one area differs from the cost in another, as it varies from house to house in the same area. If the unit be broken, there would be no end of rate-making. No logical line could well be drawn mile by mile through a service area. As the commission said, 'the question is inseparably bound up with questions of broad public policy.'"

Income Tax Deferrals

The Court also upheld the commission on its treatment, for rate-making purposes, of income tax deferrals arising from the accelerated amortization of emergency facilities. The opinion noted, "In 1950, Congress enacted S124-A of Title 26 U. S. C. A., which provides that the cost of certain facilities certified as essential to national defense may be amortized for the purpose of the determination of federal income taxes over a five-year period rather than depreciation over their normal life.

"Thus federal income taxes are lower during the five-year period because of the enlarged deduction for depreciation or amortization. However, at the end of the five years, if tax rates remain constant, income taxes will thereafter be increased over what they would otherwise have been, and the deduction will be less. Thus, over the years there is no tax saving nor tax forgiveness; but merely a deferment in taxes.

"In latter years, net income will be decreased when prior allowances for depreciation and amortization have sufficed to cover the cost of the property. This question has heretofore been considered by the State Corporation Commission, and it then

ruled that deferred taxes were to be deducted on income statements and credited to a restricted surplus account. The payment of the temporary cash savings to stockholders is thereby prevented. When the same question was presented to the Federal Power Commission, as an accounting matter, by the electric and gas industries, that commission also held that such deferred taxes should be deducted on the income statement. Later the Federal Power Commission followed the same procedure in a formal rate case."

FINANCIAL BRIEFS

Pennsylvania Power & Light Co has received Federal Power Commission approval to merge Pennsylvania Water & Power Co into it. Final argument on proceedings in the merger of the Scranton Electric Co with the Pennsylvania Power & Light Co will be held on May 24 before the Public Utility Commission.

Baltimore Gas & Electric Co will pay July 1 a quarterly common stock dividend of 40¢ a share as compared with 35¢ previously. Company will offer 575,856 new shares of common stock to stockholders on a 1-for-10 basis; employees, excluding officers, will be offered stock.

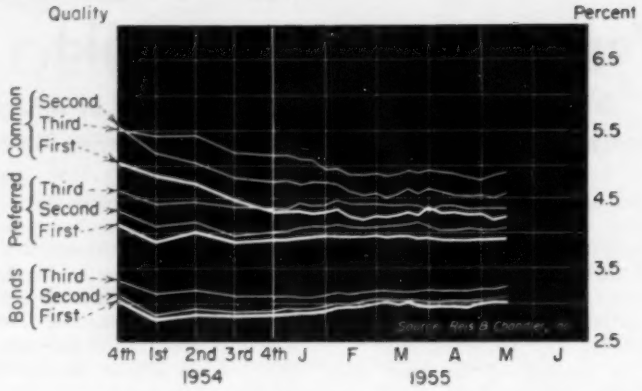
Missouri Public Service Co will pay June 13 a quarterly common stock dividend of 15¢ a share on the new common stock. This is equal to 45¢ a share paid in March before the 3-for-1 stock split.

Western Light & Telephone Co stockholders took 51,583 common shares of 57,092 offered on 1-for-7 basis at $27 a share. Balance of 5,509 shares was taken up by Dean Witter & Co group, underwriters.

Investors Mutual, Inc. has sold 8,500 shares of **Gulf States Utilities Co** $4.20 preferred stock. The fund has also disposed of 7,100 shares of 4.08% preferred stock of Illinois Power Co.

Central Maine Power Co stockholders have authorized an increase of 250,000 shares in its common stock, upping it to 3.5 million shares. Company plans to sell some stock later in year.

Today's Utility Yields—(%)



	BONDS			PREFERRED STOCKS			COMMON STOCKS		
QUALITY	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
May 12	3.02	3.08	3.20	3.93	4.07	4.37	4.32	4.56	4.84
May 5	3.02	3.07	3.19	3.92	4.04	4.37	4.24	4.50	4.80

Utility Earnings

COMPANY	PERIOD MONTHS ENDED		NET INCOME 1955	NET INCOME 1954	EARNINGS FOR COMMON SHARE 1955	EARNINGS FOR COMMON SHARE 1954
California Electric & Power	12	Mar.	$2,533,022	$2,717,924	$0.76(a)	$0.86(a)
Kentucky Utilities	12	Mar.	6,209,962	5,164,120	...	...
Montana-Dakota Utilities	12	Mar.	3,045,668	2,467,833	1.48(b)	1.18(b)
Public Service of Colorado	12	Mar.	8,404,351	7,913,343	2.52	2.33
South Carolina Electric & Gas	12	Mar.	4,956,516	3,967,971	1.38(b)	1.22(b)

Notes—(a) Based on 2,668,934 shares in 1955 and 2,490,934 shares in 1954; and (b) Based on average number of shares.

Utility Financing

COMPANY AND DESCRIPTION	AMOUNT OF OFFERING (000)	OFFERING PRICE	YIELD TO PUBLIC
MAY 12-18			
BONDS AND DEBENTURES			
Southern California Edison—conv. debs 3¼% due 1970 (being offered common and preferred holders on the basis of one right for each share held on May 17 with 20 rights entitling holder to subscribe for $100 of debs. Offering will expire June 14)	$40,951	$100.00	3.25%
Ohio Edison—1st mtg 3¼% due 1985	30,000	100.57	3.22
PREFERRED STOCK			
Public Service of Oklahoma—100,000 sh $4.24 $100 par	$10,000	$101.19	4.19%
SCHEDULE FOR MAY			
BONDS			BID DATE
Potomac Electric Power—1st mtg due 1990	$10,000	...	May 23
Alabama Power—1st mtg due 1985	15,000	...	May 23
Detroit Edison—conv. debs due 1980	60,000	...	May 24
Brockton Edison—1st mtg due 1985	6,000	...	May 25
PREFERRED STOCK			
Wisconsin Power & Light—30,000 sh $100 par (to be offered preferred holders, any amount desired, subject to allotment, record May 16 to expire June 7)	$3,000	...	...
COMMON STOCK			
Wisconsin Power & Light—263,140 sh (to be offered commonholders on 1-for-10 basis, record May 16 to expire June 7; unsubscribed shares will be offered to employees)	...	...	...
Potomac Electric Power—$11,660 sh (to be offered commonholders on 1-for-10 basis, record May 23 to expire June 7)	...	...	...
Public Service of New Hampshire—413,016 sh (to be offered commonholders on 1-for-6 basis, record May 25 to expire June 8)	...	...	...

From the top of the pole to the bottom of the hole...

GET ALL YOUR POLE-LINE NEEDS FROM Graybar

Efficient procurement of pole-line equipment and supplies is assured when you order "via Graybar". Here – from a single, convenient source – you can select from the products of over 300 of the nation's leading manufacturers of quality electrical equipment. HUBBARD hardware, CRAPO strand and static wire, RAINIER crossarms, RELIABLE connectors – plus tools, construction equipment and other pole-line needs specially-selected for utilities – they're all products you and your linemen know and respect.

No matter where the job site – populated urban districts or rugged rural areas – you're never far from one of Graybar's strategically-located offices or warehouses. Staffed by experienced personnel who understand your needs, Graybar offers you prompt, efficient service on both orders and information requests.

On out-of-the-ordinary problems, Graybar Outside Construction Specialists are always on call and glad to lend a hand. Think of it this way: if your supply problem or engineering problem lies anywhere between the top of the pole and the bottom of the hole – call Graybar first. You'll find it pays. 429-95

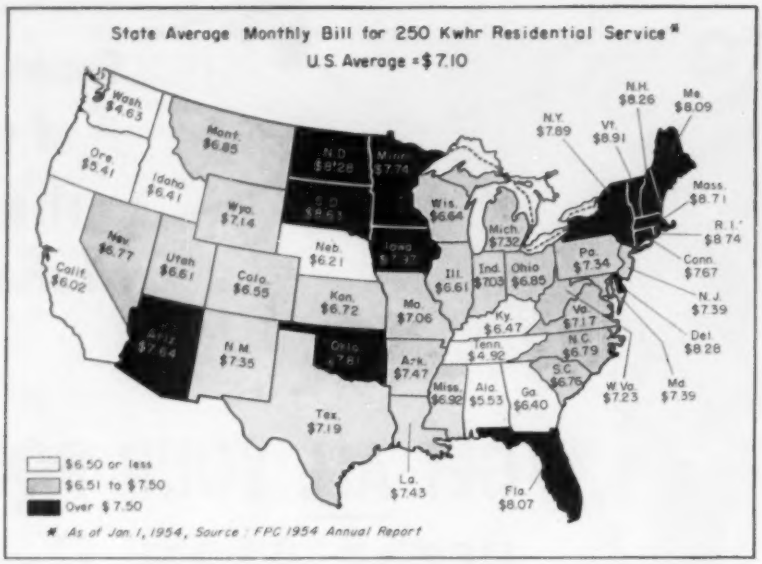
CALL GRAYBAR FIRST FOR...

Graybar Everything Electrical

IN OVER 110 PRINCIPAL CITIES

Graybar ELECTRIC CO., INC.
420 Lexington Ave., New York 17, N. Y.

STATISTICS



Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	Mar.	104.93	103.74	92.99	12.8
Peak—Class I Systems (million kw)	Feb.	83.9	84.1	74.9	12.0
Estimated Dec. '55 Peak (million kw)	Feb.	96.4	95.7	96.2	0.2
Production—billion kwhr	Mar.	44.45	40.23	38.92	14.2
hydro		10.40	8.57	9.92	4.8
fuel		34.05	31.66	29.00	17.4
Sales—billion kwhr	Feb.	38.99	39.26	34.08	14.4
residential		11.57	11.70	10.36	11.7
commercial		6.20	6.23	5.72	8.3
industrial—includes sales to AEC		19.11	19.15	15.99	19.5
other		2.11	2.18	2.01	5.1
Fuel Consumption	Mar.				
coal—million tons		11.51	11.09	9.89	16.4
oil—million barrels		6.81	7.43	6.46	5.5
gas—billion cu ft		83.41	63.63	78.23	6.6
Net Income Class A & B Co's—$ million	Jan.	112.60	109.05	111.44	1.0
Residential Customers—millions	12 mos.	43.35	43.26	42.10	3.0
revenue per kwhr	ended	2.68¢	2.69¢	2.73¢	−1.8
avg. kwhr per customer	Feb.	2,587	2,564	2,385	8.5
avg. annual bill		$69.33	$68.97	$65.11	6.5

Business Statistics . . .

Indexes: 1947-49 = 100					
FRB Industrial Production	Apr.	137	137	124	10.5
ENR Construction Cost	May	137.0	135.7	129.7	5.6
BLS Cost-of-Living	Mar.	114.3	114.3	114.8	−0.4
NEMA Sales	Mar.				
insulation materials		160	137	136	17.6
electric appliances		126	118	105	20.0
household refrigerators		106	94	89	19.1
Wholesale prices	Mar.				
motors and generators		121.0	121.0	124.2	−2.6
transformers and regulators		127.8	127.8	128.1	−0.2
switchgear and fuses		135.4	135.4	135.1	0.2
GNP—annual rate—$ billion	1st Qtr.	$370.0	$362.0	$355.8	4.0

FOLLOW THE SIGN OF QUALITY

MOLONEY ELECTRIC

Follow the "Sign of Quality" . . . all along the line. From the largest power transformers . . . thru primary and secondary substations . . . thru distribution transformers . . . to the consumer's door, Moloney Transformers are dependably handling the ever growing utility load.

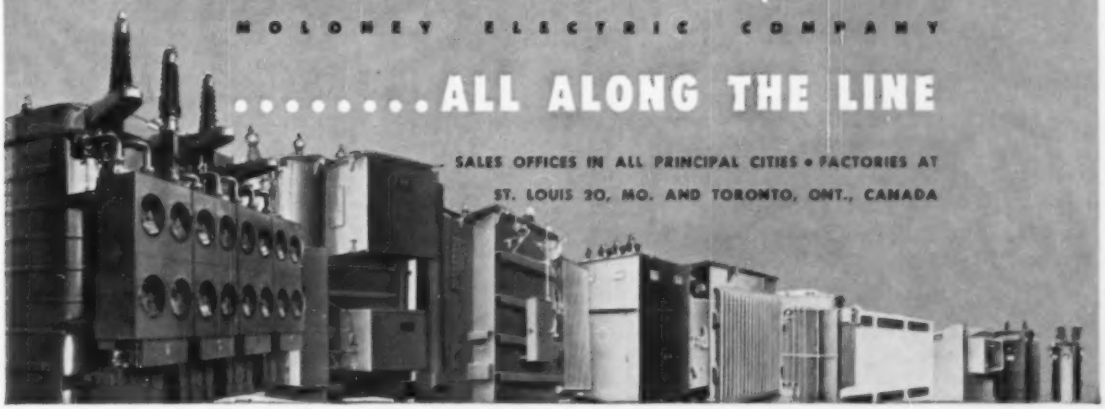
This has not come about by chance. Utility system planning encompasses and accurately measures today's demands . . . and tomorrow's. Operating records of equipment used in years past; plus today's facilities and engineering for tomorrow's needs . . . has done much to encourage the purchase of Moloney products. Here, at Moloney, it is gratifying to know that almost invariably the purchase of a Moloney Transformer by a utility means a repeat order when the need arises for more equipment. Moloney Transformers will add *dependability* to your system . . . all along the line.

MEC-2

MOLONEY ELECTRIC COMPANY

. . . . . ALL ALONG THE LINE

SALES OFFICES IN ALL PRINCIPAL CITIES • FACTORIES AT ST. LOUIS 20, MO. AND TORONTO, ONT., CANADA



Make Present Wire

Carry twice the load!

Here's How:

Most lines have extra copper to take care of voltage drop. You can use it to carry more load if you let Allis-Chalmers distribution regulators control voltage automatically.

When load is doubled, voltage drop doubles, too. That's where the ± 10% range of Allis-Chalmers distribution regulators comes in. For example, on a line with 10% voltage drop, doubling the load makes voltage drop 20%. With an A-C voltage regulator you bring the voltage drop back to 10%.

Low-cost Allis-Chalmers distribution regulators mean small capital expenditure. And close voltage control provides higher revenue, few voltage complaints.

A-C distribution regulators are ideal for service like this. They provide quality regulation at low cost . . . are easy to install, simple to operate. Get complete facts from your A-C district office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4631

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